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Original Articles

The Non-Surgical Treatment of Pelvic Inflammatory Disease

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The status of surgery, in the acute stage of infections of the pelvic structures, is definitely settled. While a few papers have recently appeared advocating major surgical operations on the Fallopian tubes during the acute stage of salpingitis, the consensus of opinion among abdominal surgeons is certainly against such practice. It is almost, if not absolutely, axiomatic that any infection which produces a surgical lesion within the pelvis does not cause death, *except* by surgery. The fatal cases of infection, starting in the pelvis, are, as a rule, those in which there is a thrombophlebitis with blood-stream infection and no gross lesion in the pelvis. In cases in which there is a definite infection of the cellular tissue of the parametrium or an infection of the Fallopian tube, the blood stream is rarely invaded, nor does the general peritoneal cavity often become involved. The infection remains localized to the pelvis and, except for the extraperitoneal evacuation of localized collections of pus, surgery is meddlesome. Such collections of pus can be evacuated by posterior colpotomy or the gridiron incision of Cullen made above Poupart's ligament.

A few years past Huggins and others strongly urged ligation of the pelvic veins in the beginning stage of thrombophlebitis. This operation is based on sound principles; it is analogous to ligation of the jugular in infection of the lateral sinus. Unfortunately, it is impossible, in the majority of the cases, to recognize the true pathology in time to operate, to do any good. Certainly the mortality would be higher from frequent operations, after labor or miscarriage with early signs of infection, than under the conservative plan. References to this operation are seldom seen in the literature at the present time, indicating that the procedure is not in general use.

Having dismissed surgery, what then is the treatment of the acute stage of pelvic infections? The treatment depends on whether we are dealing with a general infection starting in the pelvis, or simply a localized infection of the pelvis.

We are confronted at times with the difficulty of making a diagnosis of blood-stream infection. We are of the opinion that the diagnosis should be made on the clinical manifestations of the disease, even if not corroborated by the laboratory. We are not in accord with those who teach that chemotherapy or sera should not be used in the absence of a positive culture from the blood stream. If we waited until a positive blood culture was obtained, we would wait in vain, in many clinically positive cases. In our services we see many cases of fatal sepsis: The infection starting in the pelvis,

the pelvis free of palpable pathology, clinically blood-stream infection and the blood stream never yielding a culture, with the personnel and equipment of the laboratories unexcelled anywhere. The treatment of this type of cases can be conveniently considered under these headings:

(*a*) Antiserum to combat the toxins of the infection and destroy the organism.

(*b*) Chemotherapy to destroy the organisms in the blood.

(*c*) Supportive or general.

We use polyvalent antistreptococcus serum in practically all our cases. The public has been educated to the use of sera in infections and demands it. As its use is practically without danger, if ordinary precautions are used, there is no objection to it. At times we have seen results that we believe could be credited to the sera, though in the main its use is most disappointing. If used it should be given in large dosage and intravenously. Small doses into the muscles or cellular tissue are useless.

Recently there has been a revival of intravenous use of chemicals to sterilize the blood stream. The most recent and, probably, the most advertised of all similar procedures has been Piper's method of using Young's drug. During the past twenty-five years we have tried out various methods, beginning with Barrows' solution and ending with mercurochrome. From our experience we cannot see that one drug has any advantage over another. In our hands the intravenous use of germicides has been grossly disappointing. We have employed mercurochrome in many cases of puerperal and postabortal infections, and not a single one has been saved. It is only fair to say that all these cases were either positive or clinically blood-stream infections and desperately ill. However, they were just the kind of cases in which mercurochrome is reported to perform its miracles. In spite of our disappointing results we still use it and expect to continue to use it. Why? Because we have seen two results—one an infection starting in the kidney and another starting in a mastoid—that were most satisfactory. The result in the kidney case was so sudden and remarkable, it was as if a miracle had been performed. The cases in which we use it are desperately ill, the type that die. We give mercurochrome and hope for the miracle. We are not inclined to use it in the moderately severe case, the case that presents the earmarks of recovery. Mercurochrome is not without its dangers. We have seen prolonged kidney changes, severe stomatitis, and terrible reactions. We have not, however, personally seen a fatality from its use.

We have never seen any beneficial result either temporary or permanent unless there was a marked reaction after the injection, and the worse the reaction the better have been the results. The same holds true as regards sera, Barrows' solution, stronger formalin, Pregyl's iodine, and proteins. If the reaction is obtained the results are the same no matter which agent is used. This observation has led us to the belief that neither serum nor mercurochrome is in any sense specific or directly germicidal. The results depend upon a shock reaction either from the injection of a foreign protein or the manufacture of a protein in the body itself.

The supportive or general treatment is the most valuable of all. We would much rather have a sunny porch, a hypodermic with morphine and a bottle of good whisky to treat our infected cases, than all the sera or germicides ever made. Induced rest, mental as well as physical, parts of the body exposed to the sun rays, and alcohol, when the patient is toxic, have become our dependables in the treatment of these cases. Posture is of no importance except that it makes for the comfort of the patient. Nourishment and particularly fluids are most important. These patients very frequently show a decided anemia, even early in the disease. Small and repeated blood transfusions are decidedly beneficial in the presence of anemia. Blood transfusions often cause the same type of reaction as follows sera and mercurochrome, and the same beneficial results are then seen.

How shall cases with infection localized in the pelvis be treated? Put them to bed and let them alone. If pain is severe give an opiate and use an ice-bag or hot-water bottle, whichever gives the most comfort to the patient. If a stimulant is needed give it, if anemia is present combat it, but do not monkey with the pelvis. Practically all these cases will get well if not operated upon. The majority will get so well that they will never have to be operated upon.

We are sure there will be little or no dissent from the dictum that surgery in the acute stage of pelvic infection is meddlesome. It is not the object of this paper to stress such a generally accepted view, but rather to plead for a more conservative plan in the treatment of the subacute and chronic infections. There is nothing new in this plea. We have recently studied the literature on infections for many years back and find many authors pleading for non-operative treatment and advocating conservative measures with the idea of restoring the pelvic organs to their anatomic and physiologic integrity.

In considering this subject, it seems to me that two pertinent facts stand out prominently: First, the impossibility of completely eradicating the entire pathology by surgery and the attempt at the cost of a most important part of a woman's body; and second, the marvelous return to anatomic and physiologic integrity of grossly diseased structures.

In considering the first of these propositions we recognize two types of cases: one in which the cellular tissue and all the pelvic structures are involved, the so-called frozen pelvis; and the other in which the infection involves principally the tubes and ovaries.

If we consider the wide-spread changes which occur in the frozen pelvis we realize that surgery cannot possibly deal with this pathology. If surgery is done it carries with it a high mortality on one hand or a high morbidity on the other. If the patients survive the operation they are usually worse than before. The convalescence is protracted, frequently complicated by long drainage and in not a few cases with fecal fistula. Where one adhesion existed prior to operation to tease them a dozen now exists to damn them. Surgery takes from the woman her uterus, tubes and ovaries and gives her in return the distressing symptoms of the menopause. If conservation is practiced it frequently leaves the woman in more pain than she had and often calls for a second operation.

In our experience surgery accomplishes nothing in this type of case, but rather is a danger and a detriment.

Conditions are somewhat different in the tubo-ovarian cases. Here the pathology is more or less limited to accessible organs. In the main the entire pathology can be removed provided the uterus is also taken out. The operation is not particularly dangerous provided it is done at the proper time and good judgment is used in selecting risks. Of course, there occurs the occasional case of dense pelvic adhesions, with extensive traumatism resulting, from freeing the tissues. These cases result in death or post-operative disability. But what has surgery accomplished in the case that makes a good recovery? The lesions which existed prior to operation at best only produced pain and sterility. They were not particularly dangerous. It is true that there is a certain risk of relighting of the infection or even a possible rupture of a pus tube, but these complications are exceptional and not always dangerous. Pain is often cured by operation—sterility seldom is. Pain not infrequently is worse after operation and sterility is more often than not made absolute for all time. All cases are not cured by nature alone or aided, and many require surgery to relieve symptoms. Many cases are cured by nature alone and many more by medical aids, and without risk or detriment to the patient in the event of failure to effect a cure. This being so, why rush to surgery and spay a woman without first giving her a chance to retain her anatomy and physiology? Within the past two weeks

we have had two cases showing what wonderful reconstruction can take place in the pelvis.

About twenty years ago we operated upon a young woman for an old ruptured tubal pregnancy. The pelvis was one mass of adhesions; adjacent structures were glued to each other. With difficulty the left tube and ovary were freed and removed. The right adnexa were so buried they were not seen. After considerable tearing they were freed and removed. Had I such a case now I would remove the uterus as well. Considerable oozing resulted from the breaking up of adhesions, and I was compelled to pack the pelvis with gauze and use tube drainage. She had a stormy convalescence, but finally recovered. Events proved that a piece of ovary was left in the stump, as she continued to menstruate after the operation. I saw her frequently in the years after the operation and she suffered from pelvic pain and dysmenorrhea for many years. At one time I advocated operation to clean out the pelvis, which fortunately she refused. She recently gave birth to a normal baby after twenty years of married life. No pelvis could have been worse than hers, and yet nature so restored her, even after both tubes and one ovary and part of another had been removed, that she was able to functionate so perfectly that she brought forth a child. This case and another of pregnancy in which both tubes and one ovary were removed will be reported in detail at another time. I am simply quoting this case now to show what nature can accomplish. The other case was that of a young woman upon whom I operated four years ago for a ruptured tubal pregnancy. The left tube and ovary were removed. The pelvic structures were densely adherent. The right tube and ovary were freed and the tube found closed but not sacculated. As she was a young woman, just married, with no offspring, I decided to chance the non-removal of the diseased tube and ovary. Any one looking at her pathology would imagine her pelvis crippled for life. Three weeks ago I opened her abdomen for another condition. Much to my surprise I found her pelvis as normal as it ever was. There was not a sign of adhesion or remnant of her previous pathology anywhere. Many such cases must occur in the experiences of all gynecologists.

As previously stated, the advocacy of conservatism in pelvic infections is not new. Thus C. H. Stratz in an extensive article published in 1899 advocated a special hot-water treatment to allay pelvic inflammation. He states that of over 800 cases of disease of the adnexa only twenty were submitted to operation. John G. Clark, commenting on Stratz's article, said: "During the operative era of the past decade we have come to look upon the removal of inflammatory affections, especially where there are purulent accumulations, as absolutely necessary for the saving of life. Certainly a more rapid convalescence may be secured in this way, but the question has arisen in the minds of many gynecologists as to whether good results may not also be obtained by more conservative methods. As we have learned through long observation, pyosalpinx comparatively rarely causes a general peritonitis through rupture. Freund, who has been very active as an operator, and therefore cannot be looked upon as a man who is unduly timid, speaks favorably of the possibilities of conservative treatment of even such a condition as pyosalpinx. I am radically in favor of conservative measures first before resorting to the operative methods of treatment; therefore, in view of the fact that acute and chronic pelvic inflammatory cases do not, as a rule, demand immediate operation, but may with safety be submitted to conservative measures, this line should be first adopted, and in case of failure a final resort to operation may be recommended."

In 1900 Pincus, in presenting his paper on posture and compression in the treatment of pelvic inflammations, stated: "In the treatment of inflammatory exudates in the neighborhood of the uterine appendages, in the perimetrium, in the pelvic connective tissue, and in the Fallopian tubes,

operation if possible should be avoided." Clark in reviewing Pincus' paper stated: "Among the large number of patients who have been operated upon in the last decade for pelvic inflammatory troubles we may always find a considerable percentage who, while possibly relieved of the acute infection, still suffer from a residual inflammatory exudate. Of all classes of cases these seem to give the least satisfactory ultimate results."

In this connection Sanger has always spoken with no uncertain tone as to the fruitlessness of operating in these cases, "with the thought that an actual diseased process is being relieved; for these patients do not suffer from the pathologic process, but from its effects, such as more or less dense adhesions between the obliterated tubes, the ovaries, and the surrounding organs, therefore, to merely break up these adhesions and remove the ovary and tube do little or no good, because even denser adhesions may be formed at the site of the operation, and in addition to the pain, which frequently continues, the exaggerated symptoms of the menopause add a still greater burden to the afflicted patient."

In 1901 Porano recommended hot air in the treatment of pelvic inflammatory disease, and in 1906 Jung reported a similar treatment in a large series of cases. Jung states that at the Greifswald clinic the following principles are applied in the treatment of pelvic inflammatory diseases:

"1. Chronic, non-suppurative diseases of the adnexa are treated conservatively, and are operated on only after conservatism has failed, or when the local condition of the patient prevents the use of conservatism.

"2. Chronic, non-suppurative parametritis (cicatricial formations in the pelvic connective tissue) as the result of old, healed exudates, chiefly of puerperal origin, are uniformly treated by conservative measures.

"3. Suppurative adnexal tumors (pyosalpinx, peritoneal abscesses) are incised by way of the vagina and then treated conservatively.

"4. Suppurative parametritis processes are exposed to abdominal or vaginal incision, according to the situation of the pus, and after evacuation treated by conservative measures."

In 1907 the late Dr. Watkins stated as his belief that the non-operative treatment of pelvic infections is equally if not more valuable than the operative interference. "Inflammatory exudates are at the present time known to be protective agencies against the extension of infection, and they possibly play an important part in the destruction of bacteria, and the limitation of absorption of toxins." Formerly the presence of pus was considered a positive indication for immediate operation. Now it is known that pus after a short time becomes sterile and comparatively harmless in the absence of secondary infection, and that finally the bacteria and the toxins disappear. It was not Watkins's aim to condemn operations for chronic intraperitoneal exudates, but to contend that each case should be decided individually. Because a patient has had an attack of pelvic peritonitis, or because she may have some thickening about an ovary or a tube, is in itself no indication for operative treatment.

Coe in the *Medical Record* of April 27, 1907, wrote that "under the influence of rest, hot douches, and boroglyceride or ichthyol tampons, the most extensive exudate may disappear, probably through lymphatic absorption, leaving the diseased tubes clearly outlined, where before they were indistinguishable, and that a symptomatic cure may be obtained unquestionably."

Harriman in 1908 reviews the history of the treatment of pelvic inflammatory disease and shows how surgeons have gradually turned from a very radical to a more conservative view. The author came to the conclusion that although there are cases in which operative treatment was demanded, there is no doubt that adnexal inflammatory disease, even with pronuonced alterations and serious subjective symptoms, can be entirely relieved by conservative treatment.

In Amann's clinic in 1900 the indications for operation were: "When the symptoms

are acute and life threatening; when the case is certainly or apparently tuberculous; and when conservative treatment does not restore the diseased organs to a relatively healthy condition. During five years there were but seven in 1244 cases in which conservative measures failed to relieve the symptoms and restore the diseased organs to comparative health. The measures employed in this series were posterior vaginal incision and drainage, hot and cold compresses, vaginal douches, thiogenol tampons, regulation of the bowels and diet, superheated air, the introduction into the vagina of a colpeurynter filled with mercury (weighting method), massage and intrauterine electrical treatment.

George Gray Ward presented a comprehensive and valuable paper on this subject in 1916. The paper deals principally with the treatment of acute pelvic suppuration, but he also considers the final results of the infection. He quotes Schauta as an ardent advocate of total radical operation. Schauta reported 216 operations with 13 deaths, and later he reported 597 cases operated on by the radical method, 343 of which were under thirty years of age. Ward commenting on these figures says: "This seems a large proportion of young women to be subjected to a total extirpation of their sexual organs and consequently to be forever barred from even the hope of maternity, when we consider the experience of other observers with the operation of simple colpotomy and drainage in these acute cases. While it is true that a certain proportion may have to have a secondary abdominal operation to relieve them of adherent adnexa, a surprisingly large number are cured of their symptoms and not an inconsiderable number bear children."

One of the most important papers on this subject in recent years was that of Frank Simpson, presented before the American Gynecological Society in 1909. In his paper Simpson propounded three questions concerning the treatment of pelvic inflammatory diseases: "(1) Will operation always be necessary for complete restoration of health, comfort, and functional activity? (2) If operation is decided upon, will the coincidence of acute illness and operation entail more or less danger than their separate occurrence? (3) If an internal operation is decided upon, by what means may we determine that a safe time has been reached?"

In answer to the first question he divides his cases into four groups. The first group constitutes about 10 per cent of the cases and should be operated on to prevent permanent invalidism. This group includes the graver type of tubal infections due to the gonococcus, the tubercle bacilli, and other pyogenic organisms, resulting in pus tubes, tubo-ovarian abscesses, cystic degeneration of the ovaries, and extensive adhesions.

The second group are those cases in which the destructive changes have not been so great, and in which conservative surgery can be practiced to avoid total destruction.

The third group includes those cases in which the gross pathology has disappeared, leaving the tube and ovary bound down by adhesions, causing pelvic pain, dysmenorrhea, and sterility. Operation is frequently required to relieve these results.

In the fourth group the patient has her organs restored practically to normal. Such patients include many infections of puerperal origin, the organisms being the colon bacillus, streptococcus, staphylococcus, the bacillus aerogenes capsulatus, and the gonococcus. These cases form the largest group and do not require radical operation.

In reply to the second question, he believes that operation is much less dangerous after the acute symptoms have subsided. The safe time to remove the products of inflammation is not at the height of the attack, but after it has subsided.

It is his answer to the third question that constitutes one of the most valuable contributions to abdominal surgery in recent years. In reply to this question Simpson believes that a safe time for operation may be chosen with almost mathematical precision by strictly clinical methods.

And so on down the remaining years—

papers by Cullen, Clark, Norris, Simpson, Blair Bell, Polak, Holz and many others advocating conservatism and but few advocating radical interventions. Yet in spite of the teachings of the master minds of surgery this lesson of conservatism in pelvic infections has not been fully learned, and unwarranted operations are still being done in large numbers, leaving in their wake a large toll of death and disability.

We owe a debt to Gellhorn for forcibly calling attention anew to this subject in his strong advocacy of the non-specific protein treatment. The treatment did not originate with Gellhorn, but he has brought it to the attention of the American profession. In view of the facts that so many treatments have been so uniformly successful and that nature unaided cures so many cases, it would seem a work of supererogation to present another method of cure. The non-specific protein treatment has some important advantages over those already advocated. In the first place I believe it is the best treatment; secondly, it is easily given; thirdly, special instruments and equipment are not needed.

My attention was first called to the use of non-specific protein about five years ago in an abstract by Gellhorn in the *American Journal of Obstetrics and Gynecology*. The abstracts were of two German articles, which we procured and translated. Impressed with the claims of the authors we proceeded to use it on my wards at the Philadelphia General Hospital. My first case came near ending my experience with the treatment. The case was one of extensive subacute pelvic infection. She was given 10 cc. of pasteurized whole milk, and in a few hours had a most violent reaction, so that I thought she was going to die. She did not die but made a prompt recovery with an early disappearance of all the pelvic exudate. The result in this case was so satisfactory that I have continued the treatment with ever-increasing enthusiasm. The treatment is based upon the power of the protein to recharge or stimulate a fatigued cell before it is completely exhausted, so that it may recover its normal function. It has been found that if protein substances are introduced by subcutaneous, intravenous or intramuscular injections they have the power of stimulating the cells of the body to greater activity. While the parenteral injection of proteins stimulates all the cells of the body, the greatest impress is upon those cells weakened by disease. Gellhorn expresses the action of proteins as follows: "Whatever the explanation of this interesting phenomenon, it will suffice for our present purposes to appreciate the fact that by the recurring stimulus of the protein injections the affected cells are rescued from bondage, as it were; some of their normal vigor returns, and their natural means of defense become reassembled. They are now in a position to renew the struggle against the invading microbes, which represent the vast majority of causes of disease. The protoplasm again develops phagocytic properties, the toxins are neutralized by a fresh production of antibodies and ferments, the local metabolism is intensified, and the pus is absorbed. Under ordinary circumstances the infected organ or tissue may thus rid itself of its enemy, and more or less normal conditions may be reëstablished." We have seen normal conditions so restored in blocked pelves that in two cases, at least, pregnancy has occurred within a year after the beginning of treatment.

Peterson in his book gives a long list of proteins which may be used: these include normal blood (animal and human), immune sera, antitoxins, serous fluids, egg-albumin, milk, casein, Coley's fluid, etc. Substances such as turpentine can be injected to produce local destruction of tissue, which is reabsorbed into the organism as a foreign protein.

Of all these agents milk is the most satisfactory and is most extensively used. Milk for injection is prepared in several ways, either by pasteurization or by boiling: the latter being the simplest method. At times severe reactions occur after the milk injection, and it has been thought that the micro-organisms in the milk and the fats were the causes of the added reaction. It has

therefore been advised to use certified milk with the cream layer skimmed off. As a matter of fact the severity of the reaction is not a detriment except in ambulatory patients. In our hospital cases we use boiled milk, while in our ambulant cases we use one of the sterilized milk or casein products which are marketed in ampoules. The reactions are certainly not as severe after the injection of these products as after milk. For a time we felt that our results were better after milk, but we are now of the opinion that the results are the same but more quickly obtained with milk. We use milk in the wards as a matter of economy. We have felt that our best results have been obtained in cases in which the reaction was greatest, but we have obtained satisfactory results in cases in which there has been practically no reaction.

The reaction comes on as a rule three to six hours after an injection. It is ushered in with a chill, at times very severe, to be followed by a rise of temperature to 104° to 105° or even 106°. The fever remains at the crest but a short time, and then recedes to normal or even subnormal. There is frequently profuse sweating with the reaction.

Daily blood counts show a decided increase in the leucocytes which may be maintained for several days. The most striking result following the reaction is sudden relief from pain and the feeling of general well-being. In spite of the discomfort from the severe reactions, patients do not object to a repetition of the injection. They willingly suffer the ills to obtain the benefits. Two years ago I was able to compare the results of operation and protein therapy. In one of my hospitals there is a two-man service: my colleague operated, I injected milk. He had mortality, I had none; his patients, some with drainage, some with persistent sinus, and all uncomfortable, were bedridden, mine were happy and about the wards; his patients had lost their sex organs, mine had not; my patients were at home, while his were still in a hospital bed. He now uses milk injections.

It is not necessary to test out the patients before giving the injections; anaphylactic shock need not be expected or feared. The first injection is usually 5 cc. of boiled milk; the next, which is given in five to seven days, is 10 cc. The number of injections required depends upon the extent and chronicity of the lesion. Six injections, as a rule, is the maximum dose. There is a theoretical danger of producing protein cachexia and cell exhaustion if too much protein is given. This condition has been observed experimentally in animals, but has not been seen in the human. If Aolan or other marketed protein is used, the injections can be given more frequently and their use longer continued.

In addition to the general reaction there is at times a local reaction at the site of the lesion. The reaction is never severe, if care is taken not to inject the fluid into the skin. If an intracutaneous injection is made there follows a sharp general and local reaction. In the cervical gonococcus cases there is produced a profuse discharge frequently loaded with gonococci. This phenomenon is made use of in testing for the clinical cure of gonococcus infection. Before discharging a case of gonorrhea as clinically cured, we inject several drops of milk into the skin and then test the secretions for the next two days. If active gonococci are still present in the tissues they will usually be found in the discharge.

When we first started the use of protein treatment we limited it to the acute and subacute infections with dense pelvic exudates, and operations were done on the subacute and chronic adnexal tumors. Our present practice is to use it in all cases, in every phase and stage, before resorting to surgery, except for evacuation and drainage of localized collections of pus.

A few cases will illustrate our experience with the method:

Mrs. A., aged 23, mother of one child, contracted gonorrhea a year ago. She was examined by a surgeon, who found bilateral pus tubes and advised operation. My findings were the same as his, bilateral saccu-

lated pus tubes ½ to ¾ inch in diameter, with the rest of the pelvis free of pathology. On account of the chronicity of the infection and the fact that the pus was contained in closed sacs, I felt that it was a case for surgery rather than proteins. But here was a young mother, with one child and anxious for other children: to operate would almost surely take away all chance of future maternity. For this reason I advised a course of protein therapy, before resorting to operation. After six injections of protein she is symptomatically and clinically cured: she has no palpable pathology in her pelvis. Later, when there is no danger from trauma, she will be given a Rubin test for tubal patency. Even if the test shows she has closed tubes, she still has her tubes and ovaries and there is always the possibility, and not an infrequent one, of the tubes opening up. We have two similar cases treated with milk injections in which pregnancy subsequently took place.

Another patient, Mrs. B., entered St. Agnes Hospital with an acute exacerbation of a previous pelvic infection which followed a miscarriage several months before. She had a typical frozen or concrete pelvis, with a mass of exudate extending midway to the navel; no pelvic organ could be outlined. She was very ill, but clinically and bacteriologically she was not a blood-stream case. She was kept in bed, and ice-bags and opiates were used to combat pain and induce rest. She was given milk injections, starting with 5 cc. and then 10 cc. repeated biweekly. After the second injection the pain was entirely relieved, and after the eighth injection the pelvic mass was entirely gone and she was symptomatically and clinically well.

Compare this case with Mrs. C. The latter entered St. Agnes Hospital with a history of good health until the day prior to her admission, when she was stricken with acute pelvic pain and collapsed. A tentative diagnosis of ruptured tubal pregnancy was made, but on examination we found a mass completely filling the pelvis and extending as high as the navel on the right side. We felt that such a large hematoma could not form so quickly, so she was tested out with maturin for pregnancy and for urobiligen to detect free blood in the peritoneal cavity. Both these tests were negative and tended to eliminate ruptured ectopic pregnancy. She was then examined under gas anesthesia and a large elastic tumor distinct from the uterus was outlined. We then felt, in view of previous good health and sudden onset, that we were dealing with an ovarian cyst with twisted pedicle, hemorrhage, and infection, and an immediate operation advised. On opening the abdomen nothing could be seen except the omentum plastered to and hiding a pelvic tumor. In attempting to separate the omentum we opened up a large abscess, and instead of a cyst we found two large tubal pus sacs with the intestines and pelvic organs everywhere adherent: a typical picture of pelvic inflammatory disease. Before we could control the situation we had to clean out the entire pelvis and put in the old coffer-dam drainage of Price. Much to my surprise she is recovering, but still in bed with a fecal fistula and minus her pelvic organs. She is sick and always will be sick. I am satisfied that had we opened the other case we would have found an identical picture. Think of the differences in results.

I could go on reporting personal experiences and quote the opinion of men like Anspach, Adair, Rawls, DeLee, Vogt and many others in support of my contention as to the value of this form of treatment.

After a fairly extensive experience of over twenty-five years in the treatment of pelvic infections my conclusions may be summed up as follows:

1. That except for evacuation and drainage surgery has no place in the treatment of the acute stage of pelvic infection.

2. In the light of our present knowledge, operation should not be done in the subacute and chronic cases of pelvic infection until nature aided by the treatments outlined has had a chance to effect a cure.

3. Non-specific protein therapy is a most valuable addition to the treatment of pelvic infections.

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Inclusion Cysts of the Hyomandibular Region

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Much has been written on the subject of cysts of the cervical region, and many classifications have been attempted in an effort to bring a somewhat chaotic mass of data into some sort of order. Confusion has arisen from the fact that there has been a conglomeration of anatomical, pathological and regional classifications, *e.g.*, ranula; thyroglossal, dermoid, branchial cysts (fistula), etc. It seems to the writer that as good a basis for description as any is to be found in the anatomical development and its secondary effect on the possible type of cell that may suffer inclusion.

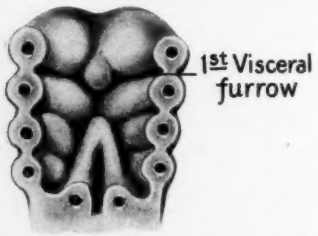

FIG. 1.—Visceral arches and furrows viewed from in front. Note the mesial membrane uniting each bar with its fellow.

Colp in a recent publication gives a very admirable résumé of the literature up to the present year on dermoid cysts of the floor of the mouth. He states that they must be considered as a distinct and separate class of cyst as compared with ranulæ, atheromatous cysts, thyroglossal cysts, etc.; and that Roser of Marburg, first in 1859, noted the fact. Mikulicz has stated that dermoids may occur in three ways: through a closure of body cavities in the midline, through a closure of channels or clefts which during fetal life were covered with epithelium, or through abnormal deposits of epidermis in the deeper tissues.

Inclusion cysts in the cervical region may be of the dermoid type or they may be lined with mucous membrane and show none of the skin elements. Some authorities, among them Kostanecki and Mielecki, conclude that cervical dermoids arise from the second cleft or visceral furrow. Dermoids from the first cleft seem to be relatively rare (Ewing). Hildebrand out of 20 epithelial cysts of the neck observed one which he referred to the first cleft. König reported a cyst from the first cleft. Kostanecki describes the dermoids arising from the second cleft as sublingual dermoids and states that they are lined by epidermis, contain sebaceous material, and the walls are free from lymphatic tissue.

A brief description of the embryology taken from Piersol's anatomy may be of help in understanding the formation. As the cysts under discussion all arose above the second branchial arch, the anatomy of these alone will be considered.

The visceral arches are best developed in the human embryo during the last half of the third week. They constitute a series of five parallel bars separated by intervening furrows, occupying the region which later becomes the neck. When viewed in frontal section (Fig. 1) these visceral arches are seen as mesodermic cylinders imperfectly separated by external and internal grooves, the visceral furrows. The first arch is spoken of as the mandibular arch, and the second as the hyoid arch. The groove, furrow, or cleft between them is the hyomandibular cleft (Fig. 2). Arising from the

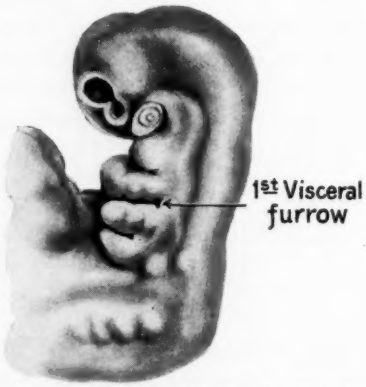

FIG. 2.—Visceral arches viewed from the side. Note the deep cleft of the first visceral furrow.

ventral surface posteriorly between these two arches appears the tuberculum impar, of ectodermal origin (Kostanecki). Just below this, between the ventral ends of the hyoid arch, appears the capula. The lingual prominences form the sides and body of the tongue, while the capula forms the root, comprising the genioglossus and hyoglossus muscles. The tuberculum probably almost entirely disappears or remains as rests. On each inner lateral aspect of the first arch appears an elevation known as the lingual prominence.

The first or mandibular process contains a cartilaginous rod. The ventral and larger portion of this rod (Meckel's cartilage) entirely disappears; the upper end, however, persists and forms two of the ear ossicles. It joins in the midline and gives rise to the lower jaw and tissues forming the inferior boundary of the oral cavity. From this arch, therefore, are formed the mandibular muscles of mastication, the mylohyoid and the anterior belly of the digastric, the tensor tympani and the tensor palati, the masseter, temporal, internal and external pterygoid muscles.

The second or hyoid arch gives rise to the smaller cornu of the hyoid bone (the body and the greater cornu being derived from the first branchial arch), the styloid process, the stylohyoid ligament, and part of the stapes. The muscles derived from this arch are the stylohyoid, the posterior belly of the digastric, and all the facial muscles, which becoming differentiated as a layer gradually cover all the neck and head as in a cowl.

Thus it will be seen that the hyomandibular cleft is really the groove or potential space separating those structures originating from the mandibular arch from the cup or cowl made by the developments of the hyoid arch; namely, the facial group of muscles, including the platysma (Fig. 3). König suggests that the position of the cysts may be influenced by the course taken by the facial artery or nerve.

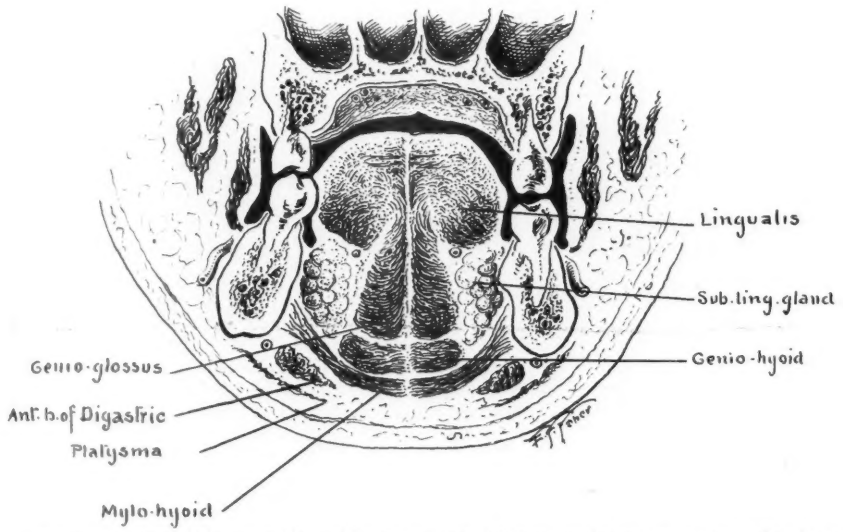

FIG. 3.—A cross-section through the jaw and base of the tongue. The clefts between the various muscles explain the varying directions taken by these cysts during their growth.

Ewing quotes Kostanecki and Mielecki as holding that the great majority of dermoids (cervical) arise from the second cleft. Yet other cervical cysts as well as dermoids do occur in the other clefts or furrows, Hildebrand stating that first cleft dermoid cysts are rare—one in twenty examined by him.

The first branchial cleft locates cysts that appear in the aural, submaxillary, sublingual and submental regions. The lining of the

cyst reproduces the structure of ectoderm or entoderm and must be definitely the one or the other; it cannot be both, for, as Piersol states, the mesial plate septum or membrane prevents this as well as precludes any possibility of there being such a thing as a branchial fistula. In order that a branchial fistula may exist, this mesial plate must be ruptured by artificial means, except the opening be median, which is never the case. Should the external groove fail to become entirely obliterated but close only at the external surface, an inclusion cyst will be the result. This cyst will be laterally placed (usually on the left) and will be lined with epidermis, and all its appendages will be those peculiar to skin at this site. If this cyst ruptures externally or be opened, then a branchial sinus (not fistula) results. These cysts have a thick, tough wall composed of all the skin layers and contain the products of skin activity, namely, sebaceous matter, hair, desquamated epithelium, etc.

If the ventral or inner groove fails to unite entirely a pharyngeal diverticulum results. If, however, it unites on the

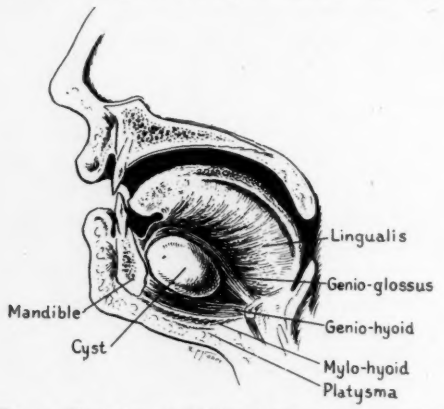

FIG. 4.—Illustrates the sublingual type of cyst occurring above the geniohyoid muscle.

pharyngeal surface only, a branchial inclusion cyst is the result. The lining of this type of cyst will be of entodermic origin and will be composed of mucous membrane (squamous epithelium) with a basement layer of columnar epithelium.

These cysts have a thin friable wall, and contain a mucoid substance; lymphoid tissue is abundant, and striated muscle, mucous glands and islands of cartilage, derived from the mesobranchial arches, may be found. Ewing states that a third group shows ciliated as well as squamous epithelium, and that these variations depend

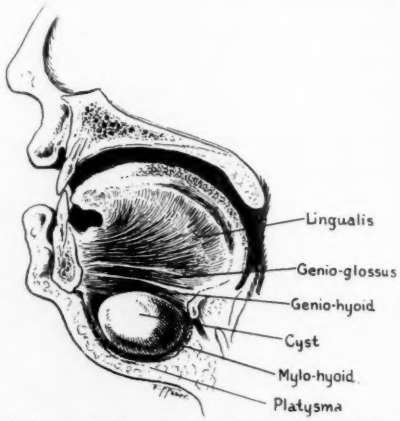

FIG. 5.—Illustrates the submental type of cyst. Note the geniohyoid muscle above and the mylohyoid muscle below.

on the character of the embryonal structures involved. If the cyst be an interrupted development of the thyroglossal duct (not branchial) it may have this ciliated epithelium and even show thyroid rests. Cysts developed from the grooves are laterally placed. Thyroglossal cysts are median in position.

Sublingual cysts or midline cysts originate (Kostanecki) in the floor of the mouth and come from the ectoderm of the first branchial arch which goes to form the lateral portion of the base of the tongue. Incomplete union of these two branchial arches in the midline leaves a defect, the mesobranchial space of His. A cyst developing here therefore may have either or both ectodermic and entodermic characteristics, and the mesobranchial dermoid is the result. If the failure of union is external to the mesodermic rod, the cyst will have dermoid characteristics only (Case 3), whereas if its failure of union is internal or ventral to the rods the cyst will be of the mucous lined type.

These midline cysts may lie at the base of the tongue (Fig. 4) above the

geniohyoid muscle (Case 2), or beneath the geniohyoid, between it and the mylohyoid muscle (Case 1, Fig. 5). These cysts, although always originating in the midline, may take a lateral direction as they increase in size, dissecting their way between structures to appear in the submaxillary region (Case 4), in the sublingual space laterally, or in the midline; or they may be partially compressed by the geniohyoid muscle and age, or at least are not noticed until they increase in size, due to sudden activity of their lining, either from hemorrhage infection or trauma, or to a gradual distention incident to an accumulation of the products of epithelial activity. Clinically they give symptoms dependent upon their position—symptoms of a sense of fulness associated with the cyst mass rather than any real pain. The aural type appears just below and in

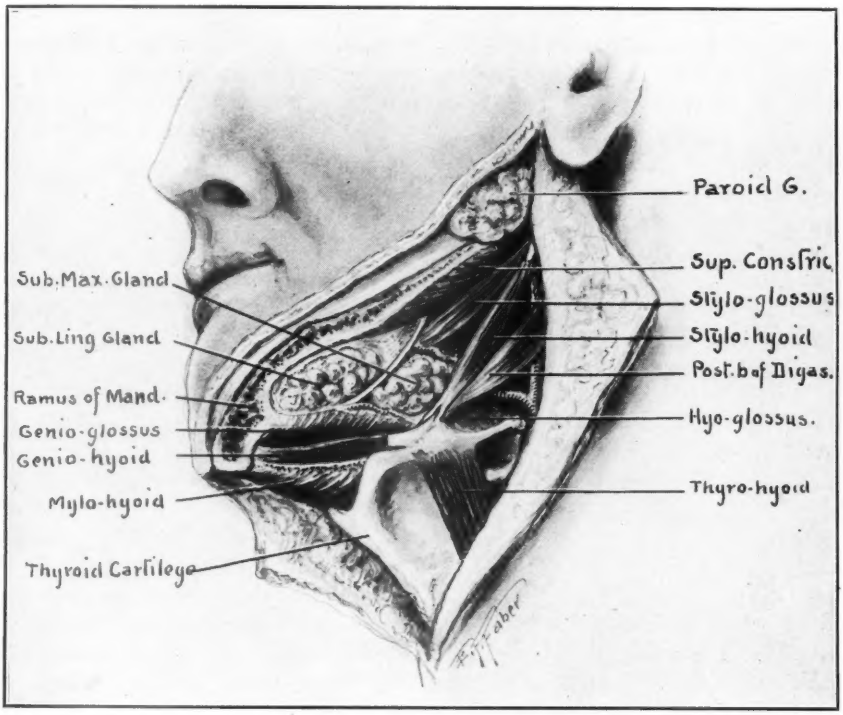

FIG. 6.—Illustrates the anatomical structures with which the development of the hyomandibular cleft is concerned.

give the appearance of being bilateral (Case 2).

The majority of dermoids of the floor of the mouth probably occur as a result of pinching off or sequestration during the fusion of the mandibular and the hyoid arches. Colp thinks that others may result from abnormal remains of the tuberculum impar. He has collected 32 cases reported as dermoid cysts of the floor of the mouth (Fig. 6).

Inclusion cysts are congenital in origin but do not of necessity appear at an early front of the ear, pushing the parotid gland before it. The submaxillary type appears as a gradually increasing swelling between the angle of the jaw and the hyoid bone (Case 4). The sublingual type appears just beneath the mucous membrane of the floor of the mouth and interferes to some extent with the movements of the tongue as well as as with the shape of the mouth (Case 2). The submental or geniohyoid type (Colp) causes no inconvenience, but is very unsightly (Case 3).

Following is the report of five cases,

three of which appeared to be dermoids and two of doubtful entodermic origin:

Case 1.—W. C., male, aged 22. C. C.: Painless swelling of left side of neck. H. P. I.: Patient was perfectly well until two years ago, when he noticed a swelling under the left side of his tongue. The swelling was soft and painful and was tender to the touch. It gradually enlarged until it was visible from the left side of his neck. He was operated at that time in another city, following which the wound drained for three weeks, the material discharged being a yellowish fluid with a bad,

Fig. 7.—Sublingual cyst after two operations. Note the scar across the center of the prominence.

rancid odor. The wound then healed but the swelling returned. The following year a second operation was done for the same condition, the wound remaining open about three weeks; following its closure the swelling returned. Since his last operation the swelling has gradually increased, extending more down his neck. About four months before admission to the hospital this time he was again operated, but only an exploratory incision was made. Physical examination of no interest except that bearing on the mass. Just below the left mandible, extending from the symphysis back to the angle, there is a swelling the size of a large orange. Extending across this is a healed linear scar. The mass is painless, is not tender, is very soft, and fluctuates and extends almost down to the clavicle. Tentative diagnosis: Cyst of neck originating from some congenital inclusion. (Fig. 7.)

Operation: Oblique incision excising the previous scar. By careful dissection the platysma was reflected upward and downward in the two flaps. The sac wall was thin and was punctured during the course of operation, and about one cup of mucilaginous fluid was removed, this fluid being inspissated mucus. When the sac was opened a beautiful dissection of the neck was visible showing the digastric muscles in the floor. The mylohyoid muscle had been divided at a previous operation. The lower pole of the sac was separated from the structures in the floor of the neck by careful blunt and sharp dissection. The median section was then separated, and lastly the upper portion was dissected free, the upper tip extending past the geniohyoid muscle to present beneath but not involving the sublingual salivary gland. The upper portion of the bed of the sac was touched with pure carbolic and alcohol. The submaxillary gland was absent, having been removed at a previous operation. Hemostasis was maintained throughout the operation. Wound was packed open with dichloramine-T gauze. Diagnosis: Sublingual inclusion cyst.

Patient's convalescence was uneventful, and he left the hospital two weeks later.

Pathological examination: Sections from this tissue show, for the greater part, dense fibrous tissue. Part of one surface of one section is covered with stratified squamous epithelial cells. In all areas these cells are orderly, regular, and well differentiated. There are scattered in the meshes of the fibrous tissue well-formed hair follicles and sebaceous glands. There is evidence throughout all sections of chronic inflammatory tissue. In view of the clinical history and the operative findings in this case, it would seem that we are dealing with a retention cyst. Diagnosis: Inclusion dermoid cyst.

Case 2.—M. W., female, aged 14. C. C.: Swelling in chin and floor of mouth. H. P. I.: Patient was well till six years old,

when following an attack of diphtheria she developed a small swelling in the floor of the mouth never noticed previously. It has never broken, never discharged, and never been painful or tender. It has since gradually developed to the present size. It has caused some change in the character of her speech (full mouth speech) but no difficulty in swallowing or breathing. No other tumor or cyst conditions in body. No cardiorespiratory symptoms, no gastrointestinal symptoms. P. M. H.: Had diphtheria at six years. Had mild attack of typhoid and influenza a few years ago. S. H.: Negative. F. H.: Quaker. P. E.: Patient is

Fig. 8, *a*

Fig. 8, *b*

FIG. 8, *a* and *b*.—Dermoid cyst of the floor of the mouth primarily the sublingual type. Note the appearance of lobulation shown in *b* caused by the restraining influence of the digastric muscle.

a female of 14 years, not appearing ill, showing tumor condition of lower jaw. Heart O. K.; lungs O. K. There is a large soft fluctuating tumor (cystic) occupying the floor of the mouth and extending through the lower jaw. It is the size of a large grapefruit. The tongue is pushed up and back in the mouth. Both upper and lower jaws are definitely widened on account of its presence during their development. No tenderness; no other evidence of inflammation. No discharging sinuses. Diagnosis: Branchial cyst in floor of mouth. Photograph taken before operation. (Fig. 8, *a* and *b*.)

Operation 6/25/24: Aspiration under local anesthesia. Silver wire suture through cyst wall. Mucous membrane in the floor of the mouth was anesthetized with a 1-percent solution of novocaine. Aspirating needle was inserted into the prominent swelling, and about 4 ounces of fluid material resembling a gastric test-meal contents was removed. This fluid was light straw color containing many flakes of material. A silver wire was inserted just to the left of the midline and was tied down over a lead shot.

6/28/24. Little or no drainage through silver wire opening.

6/30/24. Operation local. Permanent drainage established by sewing cyst wall to mucous membrane of the floor of the mouth. A section of the thick cyst wall was removed for examination. The content, about 6 to 8 ounces, of the cyst was the consistency of tooth-paste, and had a rancid odor similar to that of a sebaceous cyst material. Microscopically it showed sebaceous matter and epithelial cells.

7/6/24. Discharged improved. The cyst swelling has almost entirely disappeared. Kept clean by irrigation. Patient to return home and irrigate in the same manner for two weeks; then return for examination, when suitable dissection of cyst will be attempted.

Pathological examination: Section shows a thick wall lined with stratified squamous epithelial cells, beneath which appear sebaceous glands and hair follicles. Diagnosis: Epithelial lined cyst (dermoid).

At the follow-up photograph was taken (Fig. 8, *c* and *d*), which shows the present condition of the patient.

This is the only case in the series in which marsupialization was done.

Case 3.—M. A., female, aged 18. C. C.: Cyst of neck. H. P. I.: For the past fifteen years the patient has had a lump on the right side of her neck just below the chin. This has gradually increased in size. It is not painful or tender and did not interfere with deglutition or respiration. Four weeks ago (2/16/25) the cyst was partially evacuated by the author by means of a syringe thrust through the floor of the mouth. This did not affect the course of the swelling. P. E.: Practically negative except for neck. Heart negative for anesthesia. Lungs negative for anesthesia. Neck: There is a swelling on the right side of the neck just below the chin which is about 5 cm. in diameter, cystic, not tender, and freely movable. It is not attached to the skin but is fixed to the deeper structures. There is no sinus into the mouth. No other glandular or extraneous swellings of the neck.

Tentative diagnosis: Dermoid cyst of neck. Sebaceous cyst? Sublingual cyst? (Fig. 9.)

Operation: Gas. Large cyst of neck dissected out. Contained cheesy, brownish material. Transverse incision to the right of the midline below the ramus of the jaw, about ½ inch. The mylohyoid muscle was cut between muscle clamps and the cyst was exposed by separating the tissues down to its capsule. It was found to be somewhat attached near the genial tubercle. It was opened, its contents, a rancid smelling cheesy substance, was expressed, and the sac was removed by blunt dissection. The muscle was sutured in layers and a rubber-tube drain inserted down to the depths of the wound. The mylohyoid muscle was sutured with a mattress stitch. Skin was closed with clips.

Fig. 8, *c*

Fig. 8, *d*

FIG. 8, *c* and *d*.—Showing the ultimate result obtained by marsupialization.

Patient discharged; wound O. K.; condition good. (Fig. 9, *b* and *c*.)

Pathological examination: Section shows a fairly large cavity lined with stratified squamous epithelial cells, which is filled with sebaceous material. Just under the epithelial cells there is a dense collection of fibrous tissue. The epithelial cells which are of the squamous type are in all fields, regular and well differentiated. In a few places there is evidence of a very slight epithelial hyperplasia. This is, however,

quite orderly and the cells are well differentiated. The hyperplasia is in the form of small digitations of these cells into the subcutaneous tissue. There is no evidence of any attempt at breaking through the basement membrane or of malignant change. Sebaceous glandular tissue and hair follicles occur throughout the section. Diagnosis: Dermoid cyst (inclusion).

FIG. 9, *a*.—Dermoid cyst of the submental type, before operation.

Case 4.—C. C., male, aged 26. C. C.: A slow-growing mass in the right submaxillary region; painless and not tender. H. P. I.: Patient stated that two years ago he noticed a small, soft lump appearing just beneath that angle of his jaw, on the right side. This lump gave no pain, but gradually increased until at present it is the size of a large lemon. Physical examination: In the submaxillary region on the left there appears a lemon-sized mass deeply situated in the structures of the neck, soft, fluctuating, with a peculiar doughy feel as though the contents were thick in character. There is no evidence of inflammation; the skin is freely movable over the mass. The swelling is somewhat movable, although it appears to be fixed to some deep structures in the neighborhood of the hyoid bone. Diagnosis: Tuberculous lymphadenitis.

Operation: Under local anesthesia a small, transverse incision was made over the most prominent portion of the mass; it was opened by plunging a Kelly hemostat into its interior. Following the withdrawal of the hemostat a cheesy, rancid smelling material having an oily feel to the fingers was expressed. The cyst, as such it proved to be, contained about 3 ounces of this material, which was brownish in color. The cyst wall was extremely thick and had, apparently, an epithelial lining. By clamping the hemostat on the edge and using blunt dissection with gauze and scissors, the entire cyst was easily removed. Embedded in

Fig. 9, *b*

Fig. 9, *c*

FIG. 9, *b* and *c*.—Showing the results after operation.

the cheesy material were found several hairs.

A pathological examination was not made as the specimen was lost.

Case 5.—E. LaF., male, aged 23. Admitted to the hospital with the C. C. of swelling below the right ear, just below the angle of the jaw. H. P. I.: Eight years ago there was a swelling in the region over the right parotid which grew, gradually extending in an upward direction as far as the pinna, which was displaced away from the cranium. The limit of the swelling at that time was at the level of the external auditory meatus anterior to the pinna. In size the swelling approached that of a hen's egg longitudinally. The condition was very painful, and a diagnosis of mumps was made. The left side was not involved. Three weeks later the swelling was opened and considerable fluid, the nature of which is not known, was obtained. Two months later the swelling had largely disappeared and patient did not notice anything until two months ago, when swelling returned. It varies somewhat in size, is not painful, the skin is freely movable over it, it is cystic, and its position pushes the lobe of the ear upward. There are not at present, nor have there ever been, any signs or symptoms of infection. No salivary paucity or evidence of obstruction to the parotid function.

Tentative diagnosis: Branchial cyst or parotid cyst.

Operation: Incision 1½ inches long was made over the swelling; the cyst wall was found lying beneath the parotid and pushing it upward; the lower border of the parotid gland was isolated and turned upward. A straw-colored mucoid fluid, with no odor and no evidence of skin appendages, existed. The cyst had dissected its way through the structures of the neck until it reached up to and around the styloid processes. It was deemed impossible to excise it and it was packed with gauze. On the third day after operation, during the dressing of the case, the packing was withdrawn and the entire cyst wall, turning inside out, came away with the packing. The wound healed kindly and the patient was discharged cured.

Suspecting a possible recurrence of the same he was asked to report for follow-up examination, which he did six months later, stating that he had never had any return of swelling in his neck, the wound was perfect, and he was feeling entirely recovered.

Pathological examination: Sections show tissue of a seminecrotic type. This is thrown into folds which leave a number of clear spaces throughout the entire section. The lining of these spaces appears to be nothing more than fibrous tissue. In no place is there any evidence of epithelial cells, sebaceous glands, or hair follicles. There are a number of polymorphonuclear cells and red blood cells scattered throughout the entire section. Diagnosis: Cyst of neck with gangrenous changes of the tissue.

The surgery of the dermoid cyst is rather simple, as shown by the ease with which it was removed in Cases 3 and 4. The cyst in each case was opened, emptied, and then virtually delivered by traction. The wall is so thick and tough that it tears with difficulty, this permitting of quite a degree of traction. When, however, the cyst originates on the pharyngeal side of the mesial membrane, it is thin and easily tears, hence a most careful dissection is necessary. (Cases 1 and 5.)

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Some Applications of the Laboratory Methods to Clinical Therapeutics[1]

BY A. D. HIRSCHFELDER
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The only excuse for experiments in medicine lies in the needs that arise directly in the patient, and the only excuse for an experiment in the laboratory is when it is possible to create there conditions which are much simpler than those which are met with at the bedside, and which furnish us with solutions for bedside problems. The laboratory plays the rôle of the ham in the sandwich: it stands as the layer between the need met with in the patient and the final solution by application upon the patient. And so, this evening, I shall speak to you about several lines of work in which I have been interested, in which the experiments of the laboratory have thrown some light upon clinical problems. Some of these investigations have been done as research problems by undergraduate students in the Department of Pharmacology of the University of Minnesota as part of the elective work of the regular curriculum. I have seen good evidence to show that the experimental investigation of such problems has contributed materially to the education of these students, and in many cases to their subsequent success in the practice of medicine, even in the small towns.[2]

The first need at the bedside is clear-cut diagnosis, the most clinical of all the sciences. What can the laboratory add to physical diagnosis?

When we began at Baltimore to study the heart sounds by taking graphic records with the microphone and string galvanometer, Dr. Bond and I were impressed by the fact that some sounds were heard louder by our ears and some were magnified by the microphone, and sometimes the microphone picked up and recorded sounds that were very difficult to hear at all. I have found that some of this discrepancy depends upon the pressure which we exert with the stethoscope. When we press heavily with the stethoscope, we obliterate the rather low-pitched faint sounds that are produced by the auricle, and exaggerate the high-pitched sounds of the mitral regurgitant murmur. I found that by the simple expedient of always, wherever one listens, passing through the whole range of pressure from just touching the skin with the stethoscope to pressing the stethoscope heavily in the same place, it was possible to hear a whole range of sounds which otherwise one missed. With the lightest touch you can hear the faint tick of the auricle in cases of heart block, and with heavy pressure you bring out the high-pitched murmurs of mitral and of some aortic regurgitations. We enable our ears to do more of the things that can be done by graphic records with the microphone.

I suppose that most of you have wondered, as I have wondered, why the murmur of mitral regurgitation which is produced by a stream of blood flowing toward the back, should be heard loudest over the apex as though the regurgitant stream were flowing forward. A few years ago I had two of my students, Grey and de Sautelle, investigate this question by allowing water to flow through a dead pig's heart in the laboratory. They found that if they listened directly over the murmur, it was loudest over the bases of the papillary muscles; if the papillary muscles were cut away from the heart wall, the murmur at the apex greatly diminished. On the other hand, if they stitched the papillary muscle to the interventricular septum, the murmur which had greatly diminished over the apex was heard loudest over the septum where the papillary muscles of the chorda tendineæ were attached. So this simple laboratory experiment shows that the chordæ tendineæ and the papillary muscles act like violin strings to conduct the sound vibrations from the

[1]Read before the College of Physicians, Philadelphia, January 6, 1926.

[2]It must be understood, however, that the amount of such work should, as a rule, not be excessive. The total time spent in such investigations by the students referred to has been from sixty-six to one hundred thirty hours.

valves to the wall of the left ventricle at the apex.

We have learned an immense amount about diagnosing clinical arrhythmias with the electrocardiograph, but no one has devised a pocket edition of the electrocardiograph. So what can we do by the methods of simple physical diagnosis at the bedside? If we take what has been learned

In the sinus arrhythmias, the respiratory arrhythmias, the arrhythmia which is so common that it is practically normal in children, we find the same double pulsation, but irregular in rate—usually made regular by holding the breath.

If there are auricular extrasystoles, they usually occur as irregular occasional early beats, each showing the double venous pulse.

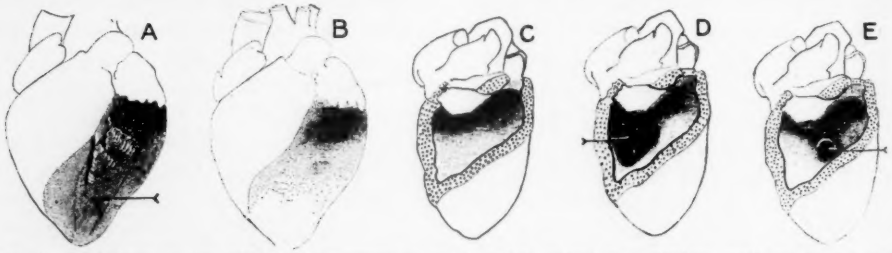


FIG. 1.—Variations in the intensity of murmur in experimental mitral regurgitation produced in the dead pig's heart, showing the violin string action of the papillary muscles and chorda tendineæ. (Slightly modified from Grey and de Sautelle, *Arch. Int. Med.*, 1911, viii, 734.) The depth of shading indicates the loudness of the murmur over the area indicated. The arrow indicates the insertion of the papillary muscle or chorda tendineæ. A. Anterior aspect of the normal pig's heart. B. Distribution of the murmur in the same heart after cutting away the base of the anterior papillary muscle. C. Distribution of the murmur over the septal surface of the right ventricular cavity after cutting away the surface of the right ventricle. D. Distribution of the murmur heard over this surface after suturing the anterior papillary muscle of the left ventricle to the septal wall of the left ventricle. E. Distribution of the murmur in the same area after suturing the chorda tendineæ to the septal wall of the left ventricle.

from tracings of the venous pulse and translate that into simple inspection, we can do a good deal more, I think, than has been suggested by Mackenzie and Lewis toward accurate diagnosis—almost as much as we

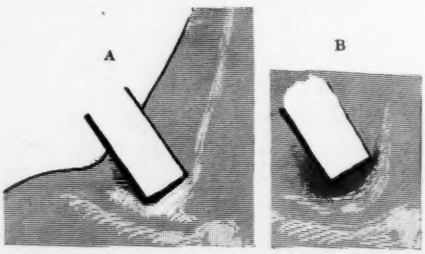


FIG. 2.—Inspection of the right jugular vein with a card held to the skin. A. Vein full (pulsation). B. Vein empty (collapse).

can in the diagnosis of valvular lesions by the stethoscope.

The normal heart-beat shows itself over the jugular vein just above the clavicle in the form of two wavy undulations for each beat that we can feel in the carotid. I shall call this the double venous pulsation. We can make these waves much easier to see by just holding a visiting card within a millimeter or two of the skin just above the clavicle.

If there are occasional ventricular extrasystoles, you get the normal double pulse, occasionally interrupted by a single big wave which usually sweeps up along the jugular vein to the angle of the jaw, and one can often diagnose this across the room.

If there is a heart block, you get three or four waves over the vein for every single beat in the carotid artery. If it is a partial heart block, the number is always the same. If it is a complete heart block, the number

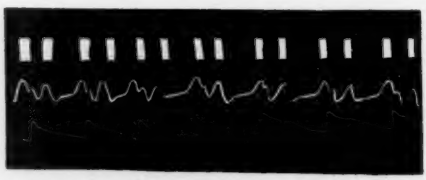


FIG. 3.—Normal (double) venous pulse. The upper line shows the pulsations, the middle line the venous pulse as recorded or observed; the lower line shows the pulsation as felt over the carotid artery.

of waves between successive heart-beats varies from beat to beat.

If you have auricular fibrillation, you find only the same number of waves over the jugular vein as you get over the carotid, but both jugular and carotid are irregular

in rate. Now as most patients with auricular fibrillation have a high pressure in their veins, you usually have to make them sit up, or even stand, to get a good visible pulsation in the veins.

And so it is possible to make use at the bedside of a good many of the things that

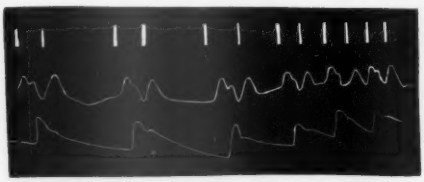


FIG. 4.—Pulsations and pulse curves in sinus arrhythmia, showing a series of slow normal (double) venous pulses alternating with a series of rapid ones.

have been learned in the laboratory; and though these simple methods do not in any way take the place of the electrocardiograph, they will help us a good deal when we cannot have the use of one.

FIG. 5.—Pulsations and pulse curves with auricular extrasystoles. The arrow points to the extrasystole, which is accompanied by premature double pulsation in the vein.

We have all been interested in the mysterious action of quinidine in stopping the irregular contractions of the auricle in auricular fibrillation, and we all have wondered how this is brought about. Hoff-

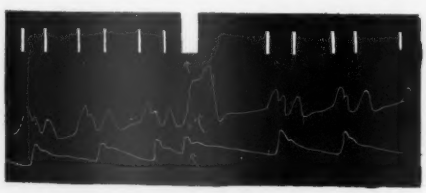


FIG. 6.—Pulsations and pulse curves accompanying a ventricular extrasystole showing the very large single venous pulse.

man, Cohn and Levy, Waddell and others, have shown that this drug lowers the irritability of heart muscle; and seemed to somewhat lower auriculoventricular conduction. Since Garrey, Mines and Lewis have made out a good case to believe that fibrillation is due to circus movements, with new impulses arising in new parts of the heart and chasing one another about from fiber to fiber instead of all fibers contract-

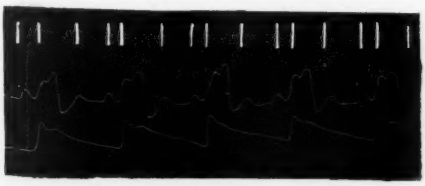


FIG. 7.—Pulsations in partial heart block. Several pulsations for each beat in the carotid, but the number between successive carotid beats is *constant*.

ing at once, as is the case in the normal contraction, this seemed to leave two possibilities:

1. That it decreases the tendency of

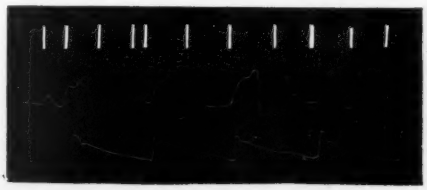


FIG. 8.—Pulsations in complete heart block. Several pulsations for each beat in the carotid, but the number between successive carotid pulses is *inconstant*.

abnormal foci to start or continue contracting independently of the normal focus.

2. That these foci continue to set up abnormal contractions, but the power of the auricles to conduct them from fiber to fiber

FIG. 9.—The single irregular venous pulse accompanying auricular fibrillation.

is so depressed by the drug that they no longer stimulate neighboring fibers.

Last year Mr. Cervenka and I investigated the action of quinidine on the terrapin's heart. We threw rapid rhythmic induction shocks into the right auricle of the terrapin's heart, and we registered the contractions of both auricles. After quinidine it took a much stronger shock to cause the auricle to contract, but every time that the

right auricle contracted, the left auricle contracted also. In other words, even with tremendous doses of quinidine there was no markedly diminished conduction from one part of the auricle to another, but the drug greatly diminished the irritability of the auricles. This would seem to throw preponderance to the view that quinidine acts by preventing the abnormal stimuli from arising rather than by depressing the conduction of abnormal impulses from one fiber to another.

We have also been interested in the new respiratory stimulant homocamfin, formerly known as hexeton, a camphor-like substance which has been prepared in Germany. It was studied in the laboratory by Gottlieb, who found that it had a camphor-like action as a circulatory and especially a respiratory stimulant, several times more active than camphor. Messrs. Kasper, Kumpf, Malerich and I studied its effects upon animals, particularly its effects on the respiratory center. We were able to confirm Gottlieb's observations that it stimulates a respiratory movement which has been

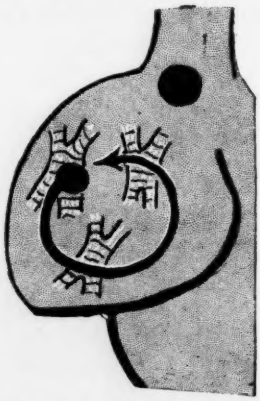
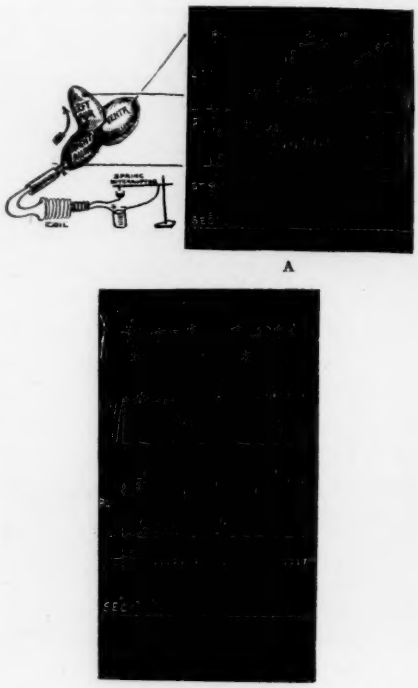


FIG. 10.—Diagram showing the course of "circus movements" from fiber to fiber in the right auricle.

depressed by morphine; and we found also that it does the same thing when the respiratory center has been depressed by too much ether. Therefore this drug should be particularly valuable in surgical operations in which the respiratory center shows signs of failure, as was found by Umber, Wich, Lowinger and Krehl. Dr. George Fahr has found that it is very useful in the clinic in respiratory depression in pneumonia and heart disease. Our laboratory experiments confirm the German observers that it is much more effective than camphor.

On account of the fact that homocamfin has this effect, and that it is also a cerebral

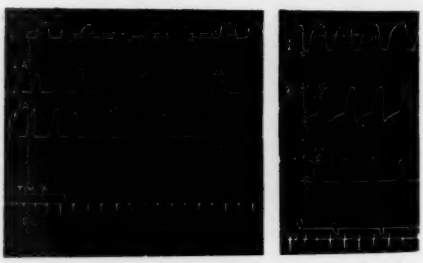


A

B

FIG. 11.—Apparatus used for stimulating the auricle of the terrapin, with curve showing the response of both auricles to the rhythmic stimuli applied to the right auricle. (A. D. Hirschfelder and C. Cervenka, *Jour. Pharmacol. and Exper. Therap.*, 1925, xxvi, 19.) A. Before quinidin. B. After quinidin.

stimulant, it ought to be particularly valuable in the treatment of the barbital (veronal) and luminal poisonings, which are now becoming so common, and it certainly does increase both the rate and depth



A B

FIG. 12.—Similar record showing the reduction in irritability of the auricular muscle. A. Before quinidin, induction coil at 8. B. After quinidin, induction coil at 0. (Stimulus very much greater.)

of respiration in rabbits which are anesthetized with large doses of barbital; but we have as yet no data as to its antidotal actions in clinical poisoning.*

FIG. 13.—Respiration and blood-pressure curve of a dog showing cessation of respiration after morphine and resumption after homocamfin, without rise in blood-pressure.

Another question of importance for practical medicine upon which we have as yet only scratched the surface is whether the ordinary clinical doses of drugs produce any actual structural alterations in the viscera, such as the liver. Our attention was called to this a few years ago by clinical observation of Dr. J. P. Schneider, who found large amounts of bile pigment in the duodenal contents of a healthy medical student who had been taking quinine in ordinary doses. Dr. Siperstein and Dr. Litman injected quinine into rabbits in amounts corresponding to thirty-grain doses in human beings, and to our surprise found that these caused cloudy swelling and vacuolization of the liver cells, and somewhat larger doses caused marked degeneration. This would lead us to believe that the same thing may be true of many other drugs even in ordinary clinical doses; and that even where histological changes are not demonstrable with the microscope, many drugs are causing very marked functional changes in the interior of the cells of the liver and other glands of internal secretion, and in the

FIG. 14.—Similar curve showing depression of respiration by ether and stimulation by homocamfin.

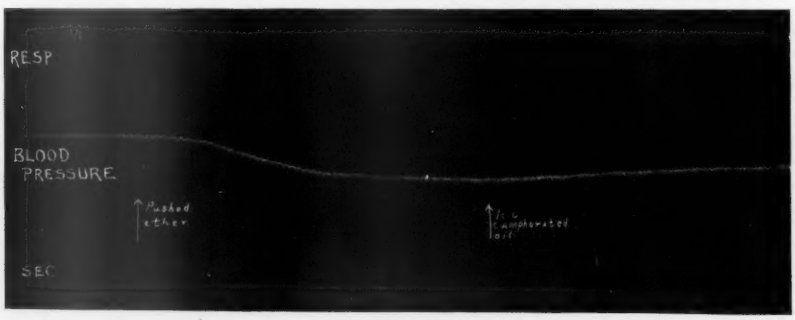


FIG. 15.—Similar tracing showing much less effect from camphor.

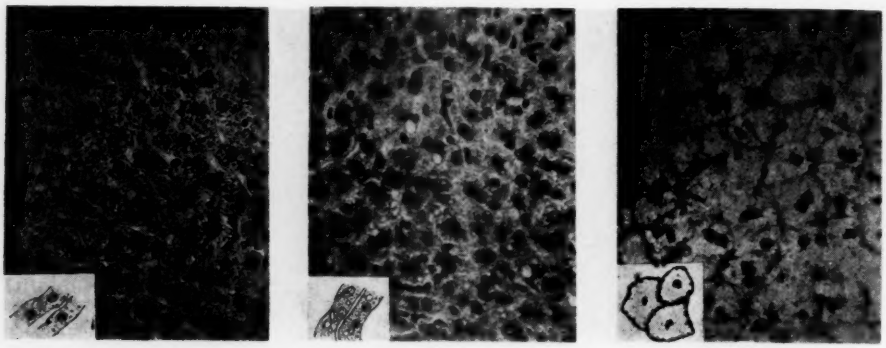
*We have since obtained similar results with cardiazol and alpha-lobeline.

permeability of their surface layers—perhaps, too, that this may affect the secretion of antibodies, either favorably or unfavorably.

I believe that the intravenous use of mercurochrome in general infections was born in Philadelphia (Piper), and as every one is using it or has used it for septicemias or localized infections, we were interested to see whether mercurochrome would actually pass from the veins into inflammatory exudates. Accordingly, Mr. Malmgren and Mr. Creavy produced some edema in the subcutaneous tissues of the neck of rabbits by injecting the black fur dye, paraphylendiamin, which gives a peculiar collar-like edema reaching from the jaw to the clavicle. Then we injected clinical doses of mercurochrome, and about an hour later killed the animals and removed the edema fluid. It was stained a nice salmon pink with the mercurochrome, and contained the drug in about the same strength as blood serum, about one to twelve thousand; but when we tested its bactericidal powers by the capillary pipet method of Dr. Kolmer, Heist and Solis-Cohen, we found that staphylococci and colon bacilli would grow beautifully in this salmon-pink edema fluid. The same thing occurs in the edema of a burnt area, or in the conjunctivitis produced with mustard oil. The mercurochrome penetrates into the tissues, but it does not render them antiseptic.

If we used acriflavine we found that the edema fluid became yellow, the dye penetrated a little more slowly, and it did not render the edema fluid antiseptic.

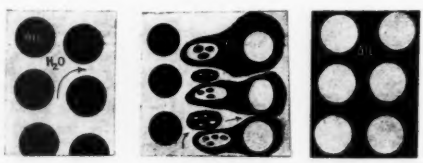
If we used gentian violet, no dye penetrated into the edema fluid at all. It was not even present in a colorless form. At least we were never able to regenerate it with oxidizing agents.



A B C

FIG. 16.—Alterations in the liver after injections of quinine. (Siperstein and Litman, *Arch. Int. Med.*, 1921, xxvii, 449.) A. Normal rabbit's liver. B. 48 hours after a dose of quinine sulphate equivalent to 30 gr. (2 gms.) to an adult man, showing slight degenerative changes in the liver with vacuolization and cloudy swelling of the cells. C. 120 hours after large dose of quinine sulphate, equivalent to 90 grains (5.8 grams) to an adult man (82 mg. per kilo), showing very marked degeneration of the liver cells.

Recently a great deal of practical importance has attached itself to magnesium sulphate as a sedative drug. Meltzer and Auer have shown that you can put a rabbit into deep sleep immediately by a small injection of magnesium sulphate; but you can wake him up in an instant with calcium. Meltzer has shown that magnesium sulphate hypodermically can be used to suppress the convulsions of strychnine and tetanus, and in pediatrics it has been used to suppress the hyperirritability of spasmophilia.



A B C

FIG. 17.—Three types of emulsions of water and oil. (Modified from Clowes, *Jour. Phys. Chem.*, 1916, xx, 407.) A. Oil in water, the ordinary type of emulsion produced by sodium oleate. B. Transition form, met with in serum tissue juices and Ringer's mixtures, in which there is the proper balance between sodium and calcium, showing both types of emulsion existing simultaneously. C. Water in oil, produced by excess of calcium or magnesium oleate.

Gwathmey has given it a much wider range by showing that very small amounts when given along with morphine seem to intensify and to prolong the action of the morphine; and still further, that small amounts of magnesium sulphate along with ether in oil by rectum can be used for rendering the early stages of labor practically painless. How does magnesium act? The strange thing about magnesium and calcium is that they are both antagonists of sodium in making emulsions, and yet they are antagonists of one another. How can we explain this?

The explanation of magnesium salt actions seems to reside in the type of the emulsion which it makes in the surface layer of the nerve cells. We ordinarily think of an emulsion as being like the tasteless emulsions of castor oil, droplets or islands of oil surrounded by water; but Bancroft showed, a few years ago, that there are two types of emulsions: the ordinary emulsions of oil in water like the emulsions of butter-fat in milk, and also emulsions of water in oil, as is present in ordinary butter. In other words, there are little lakes of water landlocked in oil and with no water channels between them. If we try to pass an electric current through milk it goes through very well. If we try to pass it through butter it encounters a tremendous resistance. Bancroft has shown than when an emulsion of olive oil is made up with sodium oleate, we get emulsions of oil in water, but when we make the emulsions up with calcium soap, we get the exact opposite, emulsions of water in oil. Clowes has shown that in blood and lymph and all the body fluids, where we have between 25 and 100 sodium ions for every one of calcium, we get both types of emulsion present, and that this balance is necessary for the preservation of most of the phenomena of life.

He also showed that the anesthetic and some of the soporific substances tend to form water-in-oil emulsions, and we have shown that this applies to practically all types of soporifics. These water-in-oil emulsions are less permeable to water and the salts and the substances concerned in cell activity, and make a higher resistance to the passage of electricity. This general fact has been shown for living cells by Osterhout.

Last summer Dr. E. R. Serles and I found that magnesium salts have a much greater tendency to form water-in-oil, the impermeable type of emulsion, than calcium salts have, because the magnesium soap is about three times as soluble in oil as the calcium soap, and both are practically insoluble in water. If you add a little magnesium sulphate to a balanced emulsion made up with Ringer's solution, it changes over to an emulsion of water in oil—what we might call the anesthetic type. So that magnesium salts should tend to coat the surface of the nerve cells over with a less permeable layer, and induce anesthesia, which it does.

Now if you add a little calcium chloride to such a magnesium-oil-water emulsion, it reverses the emulsion; the water droplets run together, and you get a return to the normal type of balanced emulsions and to normal physiological conditions; and, as Meltzer showed, the anesthetized animal wakes up if you inject calcium salts.

We can also explain the analgesic action of the coal-tar antipyretics, and of aspirin and salicylic acid, on the same basis as the action of magnesium salts. All of these drugs dissolve readily in oil and in the organic solvents, and when this is shaken up with water, they give an emulsion of water in oil just as the anesthetics do. This seems to throw more light upon the manner in which they exert their pain-lessening action than does the theory advanced by Barbour that they act by drawing more water into the blood, perhaps by first increasing the blood sugar. Barbour's investigations may explain the lowering of temperature by these drugs, but I believe that it is their solubility in lipoids which explains their pain-deadening action.

There is also one point in connection with the clinical administration of the soporific drugs which I would like to emphasize, namely, the effect of the mental state of the patient upon their mode of action. In recent years many fine soporific drugs have been added to our armamen-

tarium, especially those of the barbital series—veronal, luminal, dial, allonal, and amytal—which usually produce a perfectly normal sleep, and yet in occasional cases cause delirium, hallucinations, and even mania instead. We were interested in seeing whether mental excitement would alter the action of a drug of this series, and Mr. Carl Rice and I studied the question on rats. We found that if a rabbit is put into the same cage with a rat, the rat becomes greatly frightened, although the rabbit will not hurt him in the least. If we gave these rats doses of sodium barbital, which would ordinarily put them into a deep sleep, but kept them frightened by the presence of a rabbit, the drug did not put them to sleep. Even if we gave doses so large that they caused muscular incoördination, the rats did not go to sleep, but still kept trying to climb up the walls of the cage away from the rabbit, though their incoördination was so great that they kept falling back onto the floor of the cage.

This, I think, furnishes a valuable hint for clinical practice. It is chiefly in the nervous and excited individuals that soporific drugs cause delusions, hallucinations, and mania. When we go to sleep normally, we put out the light, darken and quiet the room, cover ourselves and warm our skin with the bedclothes, cut down the external stimuli to a minimum; and the drug assists in lowering the intensity of these sense perceptions. But if the internal stimuli of mental excitement keep on, we have a disorientation from the outside world coupled with an increased flow of internal stimuli, and illusions and hallucinations result.

The corollary to this in clinical practice is that in order to get the best effect from a soporific drug, we ought to do everything possible by the ordinary means of nursing and persuasion to bring the patient into a quiet frame of mind before giving the drug, rather than to rely entirely upon the drug to do all the work of inducing sleep.

In conclusion, I would like to say a word to you all as clinicians. In spite of the difficulties that we encounter in obtaining data in the laboratory, we who attempt to teach pharmacology to medical students find ourselves entirely at sea when we try to tell them about exact effects that they may expect to obtain in clinical practice. It is a common saying that all science is quantitative—and where can we find data from which we can tell them how much, how soon, and of how long duration will be the effects, even the grossest effects, that are commonly obtained from the most common drugs? In what per cent of the ordinary run of cases will they get any effects at all, and in what per cent will they fail? If there is anything in the world that is of practical importance, it is this question; and yet I have never seen a physician who had ever made the simplest tabulation, even by a plus, double plus or zero, as one would tabulate a Wassermann reaction, to record the effects that he himself had observed with any of the ordinary drugs in routine practice. We find in the literature plenty of data upon these effects with digitalis since Mackenzie and Cushny have made such studies rather fashionable for this one drug; one excellent paper by Hanzlik and Scott on salicylates; and some good but conflicting reports upon mercurochrome and tryparsamide. But can any one give reports on the effects in ten consecutive cases of common drugs like strychnine, nitroglycerin, camphor, belladonna, the relative effectiveness of the various purgatives; the ordinary things that our students should know about under accurately observed conditions? Until we have some such tabulated data, the teaching of pharmacology and therapeutics will continue to be based upon the effects of what are really toxic intravenous doses studied on anesthetized animals, which are quite different, often exactly opposite, from those that are actually obtained with small doses given by mouth or subcutaneously to human beings. How many of us used to believe we got tremendous effects from sixtieths and thirtieths of a grain of strychnine, until we began to study the patient's blood-pressure for an hour after giving them and found that actually we got no changes at all, or only the momentary effects that were caused by the prick of the hypodermic needle? How many of us are

still giving 1/150 of a grain of atropine and think that we quicken the pulse, though Hugh McGuigan has shown that these small doses usually have the exact opposite effect and render the pulse much slower? In fact, Dr. Nathanson, at the Minneapolis General Hospital, has shown that this is one of the very best ways to cause a slowing of the beat of most rapid human hearts.

A little later we tried out saligenin by mouth in some cases of chronic arthritis at the Minneapolis General Hospital. The physicians were given three sets of capsules labeled "Special Aspirin A, B, and C." Each set was given for three days consecutively to patients with arthritic pains, the order being varied in different patients. One set contained saligenin, one set aspirin, and one set milk-sugar. The results made out a fine case for milk-sugar in the relief of joint pains. In other words, in a small number of chronic cases, variations in the severity of symptoms are sufficient to account for a great many effects that are often ascribed to drugs—but we can find that out only by objective observations, ruling out the prejudices of the physicians.

Even in the study of a new drug on patients, the personal prejudices pro or con, from which few clinicians are free, play a tremendous rôle. It is very hard to record symptoms objectively. A few years ago I was trying to learn whether saligenin, which is at least five times less toxic than procaine, would be of use in anesthetizing the urethra. One of my friends, an excellen cystoscopist, tried it and reported to me that he got good results, but that he was so fond of alypin that he did not care to make further experiments. I asked him if he would not try a few cases, in some of which he would be given alypin, in others saligenin, without himself knowing which he was using, in order to find out whether there was really any difference. He was quite shocked at this suggestion and absolutely refused.

We are living in an era of diagnosis. When we speak of a good clinician, we say he is an excellent diagnostician. Can we not start a little propaganda for learning accurately something about what we are doing to help our patients?

The National Research Council Committee on Medicinal Chemicals is undertaking the problem of coöperative research between chemists and pharmacologists for the study of new substances synthesized in the chemical laboratory. This will do much to put us on a par with Germany in the synthesis of new drugs. But in Germany the clinicians are willing to try out new drugs and to report upon them—usually only too favorably. Can we not in this country establish this coöperation, not only between chemists and pharmacologists, but also with university and hospital clinics, to try out new drugs objectively, each on series of patients with control patients untreated or treated by other means—and become independent of Germany? And can we count on the Fellows of this College, the highest type of clinicians, for help in that movement?

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The Teaching of Therapeutics[1]

BY G. W. NORRIS, M.D.
Physician to the Pennsylvania Hospital

Dr. Hirschfelder has I think assumed that the laboratory point of view is the desirable and proper one. At the risk of appearing hopelessly reactionary I must question this assumption. I do this not because I am oblivious to the benefits of the laboratory, which serves me often and well in diagnostic difficulties, but because of what I see among the students of the fourth-year class who are sent to me for instruction in ward work.

These gentlemen shame me almost daily by my ignorance of chemistry, mathematics and physics to such a degree that I only with difficulty and with indifferent success cloak my lack of knowledge with an air of respectability.

These students of to-day know a lot about blood chemistry, osmotic pressure, surface tension, the laws of gases, the respiratory quotient, and dissociation curves. They know all about the Van den Berg test and the latest modification of the Wassermann reaction.

But they do *not* know the visual and acoustic characteristics of the normal chest. They do *not* know the dosage of the twelve drugs necessary in the practice of medicine, nor can they write prescriptions for the same. They do *not* know that the patient needs to be relieved from pain and rendered comfortable even if an immediate and accurate diagnosis cannot be established. They do *not* know that it is quite as important to recognize the kind of patient the disease has, as the kind of disease the patient has. When I mention to them such measures as hot-water bags, compresses, mustard plasters, massage, cupping, or blistering, they seem to regard me as they might an alchemist discoursing upon the philosopher's stone, or the transmutation of base metals into gold.

They are grievously afflicted with bedside blindness—that condition which Corrigan had in mind when he said that the trouble with most doctors was not so much that they did not know enough, but that they did not see enough!

So much for the student of to-day; but what of the doctor of to-morrow?

Quite recently I was asked to see a gentleman who was very ill. He had fever, had been delirious for a week, had cervical rigidity, Kernig's sign, ophthalmoplegia, and little else except slight impairment of the right apex and a history of previous sanatorium treatment for tuberculosis. My first thought was tuberculous meningitis, but the family physician could not be convinced that this was not typhoid fever. Why, said he, the Widal reaction is positive!

How often it happens that a patient with marked clubbing of the fingers, a chest full of râles and obvious bronchiectasis is bundled off to a sanatorium because some one saw an "acid-fast" bacillus under a microscope!

Such instances might be quoted indefinitely, and I often wonder, Are not the students getting too much of the laboratory point of view?

[1]Read before the College of Physicians of Philadelphia, January 6, 1926.

Editorial

DISEASES OF MIDDLE LIFE.

In a recent issue of the London *Practitioner,* Sir William Hale-White, well known for many years as one of the leading medical men of London, contributes an interesting article bearing this title.

He points out that, in his opinion, middle life consists in the period between thirty and sixty years of age, and then discusses certain points which indicate that some maladies are common during this period and others are so rarely met with that in a general way they can be excluded because the age and the malady do not fit.

He states that probably no infection is more commonly overlooked than ill health due to the presence of the bacillus coli in the urine. In other words, while recognizing that this condition is by no means rare in infancy, he believes it is most common in middle life, pregnant women being the sufferers as a rule, and he gives statistics as being 8.5 for women to 1 for man. Contrary to common opinion, he does not believe that this state is seen more frequently in association with constipation and intestinal disorders than in other patients, and he points out that in 80 per cent of the cases there is pyelitis of the right kidney alone, and the relative immunity of the left kidney so far as he knows has not yet been explained.

Oftentimes the presence of this condition results in the diagnosis of lumbago, of renal calculus, and sometimes of appendicitis. Frequent urination with pain and incontinence of urine are often present, and the urine may have what he calls a characteristic "fishy" odor, a little albumin, sometimes pus, and rarely blood.

It is to be recalled, however, that before deciding that the bacillus coli is the cause of symptoms a specimen of urine should be obtained by the catheter, as otherwise external contamination may nullify the value of the test.

Occasionally such a patient may be very ill and suffer from chills, but he insists that in the pregnant woman at least this state never calls for interference with pregnancy nor for operation on the kidney, and that it is rarely, if ever, fatal.

Again, Sir William points out that in his belief rheumatic fever is rare in middle life, unless there is a history of previous attacks. In other words, that a person between thirty and sixty suffering from an acute multiple arthritis is most commonly a victim of septic or gonorrheal infection.

Other interesting points which he mentions are that syphilitic infection usually takes place before the age of thirty, whereas the late manifestations develop between that age and fifty; that it may be difficult to distinguish between carcinoma and gumma of the liver, but that neither jaundice nor ascites are met with as symptoms of gumma; and, again, that if a middle-aged man has hemiplegia, it is probably due to syphilis of the cerebral arteries, because he has not reached an age at which cerebral hemorrhage usually occurs from advancing years.

Sir William also emphasizes a point which is not very generally recognized, that sharp thoracic or abdominal pains have often led to surgical interference, with the result that nothing pathological was found in these regions. Tuberculous meningitis, so common in children, is excessively rare in adults. While thousands of people with pulmonary tuberculosis recover completely, he insists upon the importance of hemoptysis as being a grave symptom, believing that for practical purposes it always means tuberculosis, but on the other hand he states that if there are no physical signs elsewhere in the lungs, a cavity of the lung at the base should never be diagnosed, for such a diagnosis is sure to be wrong.

He thinks that the dread of some practitioners of the use of sleep-producing agents in pneumonia is erroneous, for in this disease sleep at night is all-important, and the best drug for this purpose is opium or morphine.

Again he points out that while acute bronchitis is a serious malady in the old and

the young, it is not so serious in the middle-aged, and that asthma, which is not uncommon at the age of thirty, diminishes in frequency in later years of life.

He believes that if disease of the aortic valves alone is present, or if it precedes that of the mitral leaflets, the cause is almost certainly syphilis. And, again, that drug addiction is more apt to occur in middle life than at other periods. We do not think that this is in accord with general experience, since addicts in the United States are most commonly met with, we believe, below thirty and in diminishing numbers as old age is approached.

Finally, he urges the importance of vaginal and rectal examinations when symptoms of trouble are present in these regions, because all too frequently in this period of life the presence of carcinoma is not recognized until the disease is well advanced.

In the same journal, Sir Thomas Horder deals with certain aspects of this subject under "Diseases of Adult Life," taking up the consideration to a large extent of pathological blood-pressures. He emphasizes the necessity in the presence of arterial change of avoiding stress and strain, since the patient under these circumstances cannot have what he calls the "enviable joy of stretching nerve and vessel and feeling them bend back again to their natural state as soon as the strain is relaxed." He advises mild exercise in the open air, which means the lost art of walking; an hour's rest in the middle of the day, early going to bed, and investigation into any metabolic defects which may be present.

In regard to diet, he believes it should be most moderate, and reminds us that Dr. Leonard Williams would have us all fast for three days now and again, and if this be true for all, it would certainly be true for the high-pressure patient. He suggests that the substitution of red meat by a meal consisting of a few biscuits and a piece of chocolate would often be a valuable measure, although the high purin content which we know is present in chocolate would in our opinion seem to indicate that some substitute would be better. It is all very well to tell a patient to starve himself for three days, but the busy man finds this most difficult, and Sir Thomas quotes one of his patients, who said to him pathetically, "My life is already one long Lent." We must always remember, as Robert Louis Stevenson said, that "it is better to travel happily than to arrive," and in many instances we can do so little for high blood-pressure from the standpoint of dietetics, except by advising moderation, that the patient is made wretched both mentally and physically by rigidly excluding customary articles from his diet.

Evidently Sir Thomas does not regard tobacco in moderation as an evil, but does consider that so far as alcohol is concerned in hypertension, the less the better. He also emphasizes the value of equanimity in these patients. In our experience too rigid rules as to exercise and diet serve to prevent the patient from assuming this much to be desired mental state. He may be urged to give up certain things which disturb his mind, but it is a vital mistake to give him the impression that he is an invalid.

Finally, we note with interest that Sir Thomas is not one of those who believe that infected areas in the gastrointestinal tract, to use his words, "behave as breweries of toxins that are responsible for progressive cardiovascular degeneration."

SUGAR AS A SUSTAINING AGENT.

Studies made upon German troops before the Great War seemed to indicate that moderate quantities of sugar are useful in enabling men to make forced marches without undue fatigue, and at various times the free use of this substance has been recommended in cases of cardiac failure, because it was believed that the sugar provided adequate cardiac sustenance.

Recently Burgess Gordon, and a number of associates, reported to the *Journal of the American Medical Association* the state of the sugar content of the blood in Marathon runners. They found that in such runners there was a marked diminution in

blood sugar and also that a close correlation existed between the physical condition of the runner at the finish and the level of his blood sugar. Thus, in the runner who fell out of the race, or fell on finally reaching the tape, the condition of exhaustion often presented a picture similar to that presented by a patient who has had an overdose of insulin. For this reason they determined, on the occasion of the following Marathon race, to see to it that a large amount of carbohydrate food was given the contestants the day before, as much as could be given without inducing digestive disturbance, and it was decided to furnish sugar in some form to be used by the runners during the race. The result was interesting in that the runners came through in much better shape under these circumstances than they had in the previous year. For this reason these investigators advise that in all attempts at the expenditure of large amounts of energy, candy or other easily assimilated carbohydrate food shall be given.

This research may seem to possess little interest to the practicing physician, who is rarely, if ever, called upon to treat an athlete before or after a strain upon his physique, but as a matter of fact it is of the greatest possible interest to every practicing physician.

The writer of this editorial has long taught that the method of starving a patient for twelve or twenty-four hours before a severe surgical operation sends him into the fight ill prepared to stand the shock. We are well aware that it is most unwise to have food in the stomach when the anesthetic is given, but this in no way need interfere with seeing to it that the liver is well stored with glycogen for several days prior to operation, a storage which may be materially helped by aiding in the digestion of starchy foods by the use of taka-diastase and possibly by the moderate administration of various forms of sugar. Such a form of treatment may also have marked advantage for physicians, lawyers, and business men who find it difficult to eat an adequate meal in the middle of the day, and who all too frequently eat some indigestible food which strains their digestion at a time when it ought to be called upon to do the least amount of labor.

It is interesting to note that human instinct may be responsible for the enormous consumption of sweet drinks which takes place at the present time and which has been supposed to be due in part to the inability to partake of alcoholic beverages. In other words, without knowing why, the man or woman who was driven in business found through centuries that alcohol was burned up in his body without difficulty and gave him energy, and again as a matter of instinct rather than knowledge, he or she finds that a sweet drink provides him with energy in an easily assimilated form, although it requires more activity on the part of his digestive and assimilative functions than did alcohol.

WHAT IS THE STATUS OF TRANSFUSION?

It is only within the last twenty years that transfusion may be said to have become popular. Before that time it may be said to have not been practiced at all, and it was not until we had fairly complete knowledge as to blood grouping or blood matching that it was possible for it to be resorted to as a moderately safe therapeutic measure. During the past two decades hundreds of papers have been written and many devices have been brought forward to aid in the transfer of blood from one individual to another.

There still remains some difference of opinion as to the value of direct transfusion as compared with that done by the so-called indirect or citrate method. There also remains a good deal of doubt as to the limitations of transfusion as a medical measure in distinction from what might be called a surgical measure, meaning by the latter term its use to enable the patient who is anemic to withstand a grave operation or for the purpose of resuscitating a patient who, as the result of traumatic or surgical hemorrhage, is in a desperate plight.

So far as we know, for very good reasons transfusion has been resorted to little or not at all for the correction of true secondary anemia. It has been used very largely, however, for the relief of persons suffering from pernicious anemia, and the time is rapidly approaching when very definite, and what may be called final, conclusions can be arrived at as to its value in this hitherto incurable malady.

The writer of this editorial has had a fairly large experience in observing this type of case. He has had the opportunity of examining one patient who in the course of many months has received something like sixty transfusions without any untoward manifestations and with apparent benefit, in that his urgent symptoms have been relieved, and that his general condition of health is as good or better than when the transfusions were begun; but it is becoming increasingly evident that this method of treatment in his case, while quite justified, is nevertheless only a temporary measure. It is like renewing the water in a bucket which constantly tends to become empty because of a leak.

In addition to this patient, the writer also has had under his care a very considerable number of those who have had anywhere from one to four series of transfusions, averaging six or eight apiece. With practically no exceptions these transfusions have not been followed by any evil results, but in none of them has the disease been arrested, and after a certain number of months death has ensued in several instances. Still others are now under treatment, with improvement in their symptoms and increase in strength, but they suffer a relapse if too long an interval is allowed to pass by without another gift of blood.

Recently Baldwin has contributed to the *American Journal of the Medical Sciences* a paper which deals with the dangers and limited value of blood transfusion. He asserts that an epidemic of blood transfusion has been passing over the country and that a very considerable number of deaths have ensued as a result of transfusion, quoting a number of authors whom he thinks agree with him in this respect. He quotes not only instances of fatal anaphylaxis, but also instances in which, by inadvertence, syphilitic infection was so transferred. Of course this is an absolutely inexcusable accident. Without doubt, too, most of the evil conditions which he quotes might have been avoided if grouping had been done by some one really skilful in this phase of the technique.

Baldwin sent out a questionnaire to about forty of the leading surgeons of the country, and found that most of his very favorable replies were made by their juniors, who had the enthusiasm of youth, and were in marked contrast to the expressions of opinion by the men of greater experience. Thus fourteen men pronounced it of no value in acute sepsis, and three not only regarded it as useless but even dangerous, while two of them thought it of doubtful value. The same opinion seemed to exist also in regard to chronic sepsis, and our limited experience with these cases leads us to join in this opinion.

We gather from Baldwin's paper that he firmly believes that transfusion is by no means free from danger, which, in some cases, is absolutely unavoidable; that it is of no value in acute sepsis, but on the contrary it is particularly dangerous in the presence of this state; that in chronic sepsis it may improve the anemia, but has no specific effect upon the parasite. He also agrees with our view that it is only a "stop-gap" method of treatment in pernicious anemia, and that its chief value is immediately after an exsanguinating hemorrhage from any cause. He also thinks that it has little or no value in shock unless the shock is the result of acute hemorrhage, but he admits that the value of transfusion in new-born infants who are on the verge of death as the result of hemorrhage has been conclusively established. Further, he states that in such a patient it is unnecessary to type the mother's blood, which can be taken at once and injected intravenously into the superior longitudinal sinus of the child.

Finally, it is interesting to note in the writer's experience that while the patient is kept alive or in fair comfort for a time by

transfusions when suffering from pernicious anemia, he generally is saved long enough to develop many distressing symptoms which are characteristic of the late stages of this strange disease, as, for example, paresthesias and various forms of spastic contraction or total loss of power in the lower limbs.

As most patients, if given the choice, would choose to prolong life even if warned that such symptoms may ultimately ensue, we shall still continue to resort to whole-blood transfusion as the best remedy known at the present time. No one can find a true remedy until the etiology of pernicious anemia is discovered.

THE DURATION OF THE ACTION OF PITUITRIN.

It is well recognized, of course, that the method by which a drug is administered has much to do with the promptness, the degree, and the lasting qualities of its effect. Given by the stomach, prompt absorption is often impossible. Hypodermic injection, except in the presence of dropsy and shock, is prompt and reliable. Intramuscular injection is very much more rapid, and, of course, intravenous injection produces an effect which may be said to be immediate, provided the drug is one which is capable of exercising its influence almost at once, in distinction from a slowly acting remedy like digitalis, which even when it is given intravenously takes some time before its full effects are manifested.

Recently Knaus has studied the rapidity with which pituitrin is absorbed and the duration of its effect when administered by the hypodermic needle or when given into a vein. The results obtained are what might be expected; namely, that the increase in blood-pressure after the intravenous injection was very much more prompt than after the intramuscular injection, but was correspondingly short-lived; the intramuscular injection being followed by a gradual rise and a relatively prolonged adherence to this effect.

While these experiments were made upon animals, his results are interesting as indicating the method which should be followed by the physician according to the exigencies of the case.

Knaus makes a statement in regard to pregnancy in human beings concerning which we confess we were ignorant until the appearance of his paper, namely, that the absorptive capacity of the subcutaneous tissues is impaired during pregnancy. We do not think that the experience of practical obstetricians will confirm this of the pregnant woman in health.

It is obvious that the subcutaneous or intramuscular injections are quite adequate in the vast majority of instances where a stimulant to the uterus or to blood-pressure is desirable. Perhaps it is not saying too much to intimate that in any acute emergency where cardiac failure engenders what might be called desperation, adrenalin, because of its more prompt influence, is probably the endocrine preparation which is to be preferred.

DOES MAGNESIUM SULPHATE INCREASE THE SEDATIVE EFFECTS OF MORPHINE?

Many of our readers are aware of the fact that various laboratory workers and clinicians in different fields have thought that by using 20 or 30 minims of a 25-per-cent or 50-per-cent solution of magnesium sulphate with morphine they can greatly increase the efficiency of the latter drug in relieving pain and producing sleep. Indeed many of the clinical reports have seemed to be so striking that this method has become fairly popular, although we must admit that the quantity of magnesium sulphate so administered is so small that it is difficult to imagine how it can act as a synergist. Indeed, one would suppose that the introduction of a hypertonic solution of magnesium sulphate into the subcutaneous tissues would, under the laws governing osmosis, tend to delay the absorption of morphine to such an extent as to considerably diminish its efficiency at any given moment, because such a deposit of a

hypertonic solution would cause fluids to pass into the area injected rather than the reverse.

Recently Beckman has carried out a series of experiments which have led him to believe that those who have faith in the combination of morphine and magnesium sulphate lie under a delusion, and, further, that its employment to increase the efficiency of a general anesthetic also rests upon a fictitious basis. Beckman asserts that his careful investigation, using animals as tests, proves that such a synergism does not exist, and he also makes the sweeping statement that there is no satisfactory evidence to show that such an effect is produced in man.

Those who believe in this combination probably will not be convinced by Beckman's paper, and it is evident that the subject cannot be as yet considered as finally settled, but we are inclined to think when final conclusions are reached, certainly in regard to hypodermic injections, that Beckman will be proved to be correct.

ARTERIOTOMY.

Vascular surgery has reached the point of no longer being novel, and hence the results of its application do not, as they did once, occupy a large place in our medical literature. None the less, there is steady progress in larger knowledge; and an occasional case report or laboratory study which assures the profession of this fact. Thus the heart valves have been attacked directly, the interior of the heart has been palpated, there has been devised an instrument by which it may be seen. At least one case has survived and apparently been bettered by palpation and digital and valvular dilatation.

Matas' operation of aneurismal occlusion or, when circumstances were favorable, restoration of continuity in the dilated vessel is accepted widely and applied successfully.

The problem of relieving arterial block when this involves the extremities has been attacked, but not with such large measure of success as might have been hoped for. When the block is thrombotic, since this thrombosis is necessarily associated with an abnormal condition of the intima, its clearance will be followed by the formation of another clot, nor have there been any recorded cases of success from the removal of the thrombus. Embolic obstruction is different; here there is a sizable clot washed from the left heart and occluding a main artery. If there be no adequate collateral circulation the result is death to the part supplied by the blood of this artery. At the time of lodgment of the clot the arterial coats are presumably healthy. If the clot be removed blood should again circulate through this section of the artery and life to the part be maintained. It was on this theory that Rubesch removed from the femoral artery a bullet which had been carried from the left ventricle and caused complete block. This operation did not prevent gangrene from following.

Lian and Moure (*La Presse Médicale*, September 23, 1925) report a successful case of removal of a clot from the right axillary artery within twenty-four hours of the time of its lodgment. The patient suffered severe pain and the extremity became pale and cold. The point of lodgment was characterized by local tenderness to palpation. The artery was exposed, the clot removed, and a suture applied. The pulse at the wrist was at once restored. It disappeared for a time, but again came back and remained normal. The patient made a complete recovery. The ordinary technique as set forth by Carrel was practiced, the wound being perfused during the operation with oil and protected against all handling in the line of vascular incisions.

Before practicing the procedure, on the success of which so much depends, the surgeon should be moderately well assured that the collateral circulation will not adequately care for those tissues deprived of blood by the sudden blockage of the main vessel. In favor of the radical procedure, it is pointed out that even though there be a collateral circulation sufficient to main-

tain life, it can never be as efficient as the original blood supply and leaves the part permanently vulnerable and weak. A successful arterial suture restores circulation to normal and at once.

THE TREATMENT OF FRACTURES.

The enforcement of compensation for disability is probably more responsible for a better knowledge, and a wider application of this knowledge to the treatment of fractures, than is the experience of the world war as set forth in journals and text-books. A factor incident to compensation is the growing tendency toward holding the physician responsible for results which might have been better; this not because the working man has become more distrustful of medical ability, but because intelligent employers and insurance companies see the advantage incident to an insistance upon securing for those concerning whom they have assumed financial responsibility treatment which is modern and approved. An obvious method of insuring skilful treatment by the surgeon, is to bring suit for malpractice when, following an accident, the period of disability is unduly prolonged because of inapt or inadequate treatment.

It is astonishing to one who keeps in touch with medical progress that methods revolutionary in their character and in the direction of betterment so slowly permeate the entire profession. Thus Garfield was shot more than a decade after Lister's complete demonstration of the value of cleanliness and many years after Nélaton had taken the probes from his army surgeons. Half an hour after Garfield was shot the surgeon called in to see him probed, probably with instruments taken without cleaning from a plush-lined case, and repeatedly introduced his little finger, probably not even superficially washed, as far as it would reach into the bullet wound. The subsequent osteomyelitis and septic death might have occurred had there been no such instrumental and digital trauma and contamination. At the autopsy the bullet was found encysted, sterile, harmless and remote from the area of suppuration.

There are general principles applicable to the treatment of all fractures, to wit: their proper management calls for special skill; their diagnosis should be made by the *x*-ray; their setting should be guided and checked by the fluoroscope; their splinting should be done by one who has more than a reading knowledge of the subject or small experience therein; their subsequent course should be followed by the fluoroscope and *x*-ray.

Hence it follows that fracture cases should be relegated to one or more men with access to the needful equipment and who are especially trained in diagnosis and treatment.

These principles are applied in very few hospitals, and the failure to apply them is responsible for probably the vast majority of more or less crippling results.

There is a tragically large percentage of crippling incident to ignorance of approved modern methods of securing proper apposition and adequate retention. In this relation the work of the Fracture Committee of the American College of Surgeons is of major importance. Scudder *(Boston Medical and Surgical Journal,* November 12, 1925) tells of an insurance clinic from which not one of 100 fractures of the shaft of the femur has been able to return to his original job because of inefficient treatment, and contrasts this with another clinic in which of several hundred unselected cases of fracture of the femoral shaft in adults every individual is back at his original work and receiving the same wages as before his injury. All of these returned to work practically within five months of their accident.

At the suggestion of this Fracture Committee the American College of Surgeons now requires a minimum equipment in all general hospitals to care for the emergency treatment of fractures, and has set forth in detail the armamentarium required. Moreover, the College advises the use of a special sheet for fracture records, this

having been recommended by the Committee on Fractures of the American Surgical Association. It also urges better undergraduate instruction in fractures.

In this relation Sinclair *(The Practitioner,* November, 1925) notes that treatment of a fracture should be continuous and consecutive from the time the surgeon first sees the injured one until cure is effected. The ends in view are the correction of the deformity, the maintenance of the corrected position until union, the preservation of the mobility of the joints and particularly that immediately below the fracture, and the gradual restoration of the lost function of the limb.

In regard to fractures in the aged Saner speaks of the need of maintaining the morale of the patient, a most important matter.

It is worthy of note that the Fracture Committee has arranged to get in personal touch with all of the hospital surgeons in this country, and to hold them responsible for results, satisfactory from the standpoint of function and creditable to the profession.

Progress in Therapeutics

Medical Therapeutics

The Treatment of Malaria in Britain.

In the *Practitioner* for November, 1925, Ross states that almost any oral doses of the sulphate, bichloride, or bihydrochloride of quinine, from 10 grains or even less a day to 100 grains or even more a day, will suffice in these cases of relapse to reduce the fever within three days, and to make the asexual parasites fall below the practical finding-point in five days; and the size of the dose above the 10 grains makes little difference in these clearing-times. No known medication, even if continued daily for considerable periods up to two months or more, will absolutely preclude relapses, even while the drug is being taken, in a percentage of cases up to, say, 25 per cent or more—though the relapses usually become progressively milder.

For these and other reasons he infers that no dose of quinine can of itself destroy more than, say, 20 per cent of the asexual parasites actually present in the patient on the day when the dose is given. If next day's dose kills the same proportion of the remaining parasites, and so on, day by day, then, by a simple logarithmic calculation, he infers that this dosage must be continued daily for about three months before the infection is extirpated entirely. Few medical men recognize how slow the process of destruction may be. The 100-per-cent "parasiticide" is not known for any infection, and is probably unattainable (without killing the patient as well). Even if a drug could be found, such that a single dose of it would kill, directly or indirectly, 90 per cent of the parasites present (malaria or other), then one dose would reduce a hundred million parasites to ten millions, two doses to one million; and eight successive doses, even of such a powerful remedy, would be required before the invaders could be reduced to one solitary individual. No malaria cure even of this strength is known. Even a 50-per-cent parasiticide would only reduce a hundred millions to fifty millions, and a second dose to twenty-five millions, and so on; and twenty-seven successive doses of it would be required to reduce the hundred millions to a figure less than unity. Of course several secondary factors will come into play at the same time, especially the host's personal resistance (*a*) to the parasites and (*b*) to the drug, whatever it is; and these are likely to vary from person to person and from time to time, and to affect the final result, perhaps very largely. For further details Ross refers to his article on

"The Principle of Repeated Medication for Curing Infections," in the *British Medical Journal* of July 2, 1921. We do not know why or how quinine-taking reduces the plasmodia, but that it does so is perhaps the best-established fact in therapeutics—though, as he has said, it is scarcely better than a 20-per-cent parasiticide. Other considerations, such as the simultaneous proliferation of the parasites, would require fuller treatment than this rough sketch aims at.

The general practitioner's duty is not to seek the 100-per-cent parasiticide at the risk of his patient's health, but, if possible, to destroy all the plasmodia in his patient without relapse. For this purpose he recommends, and uses for his own private patients, the following treatment for men: ten grains of quinine sulphate, hydrochloride, or bihydrochloride, preferably in solution, once a day just before breakfast every morning for three months. The patient becomes accustomed to this after a few doses, and the following meal takes the taste of the medicine out of his mouth. Complaints of indigestion or even vomiting are always made by a few persons, and to them the same doses in tablet or capsule may be exhibited. He cured his own malaria in 1897 with this prescription taken for four months, without any relapse. If relapses do occur, it is generally within the first three weeks; and they should be treated with an additional similar dose before dinner on days when the temperature is above normal, and for three or more days longer, after which the single daily dose is resumed—smaller doses, of course, for women and children. The bowels are to be kept regular, preferably with a dose of paraffin at bedtime, and a glycerin suppository every morning on waking, if necessary. A large number of modifications are used by various practitioners, such as 30 grains twice a week, or on Saturdays and Sundays, or the doses at bedtime, or half-doses twice a day, and so on; but he finds that patients become more quickly accustomed to the single morning dose, and are apt to forget or elude the biweekly dose when the day comes around. The great thing is to continue the treatment steadily. One month should be insisted on; and if the patient rebels after that, he should be warned that relapses are likely to occur as long as a single parasite exists in his blood. The ideal object is to destroy the whole brood. Intramuscular injections of 15 grains may be employed at first for obstinate, refractory, dyspeptic, or serious cases, but they have no advantage for parasiticidal purposes over the oral doses, and sometimes cause local mischief. Intravenous injections have perhaps a little higher parasiticidal index than the other routes; but three out of ten cases relapsed after 10 injections on ten consecutive days each, and they are seldom used except for very serious or sudden cases. Rest in bed, iron, arsenic, and alcohol may be given when indicated, morphine for severe rigors, and diaphoretics at the height of the fever. In cases with a history of blackwater fever, quinine must be commenced very cautiously, and it is best to consult a specialist for them and for cases complicated with dysentery and possible hepatic abscess.

The actual length of the daily 10-grain course required to exterminate the parasites completely should depend (*a*) upon the number of asexual parasites present at the commencement of the treatment, and (*b*) upon the patient's natural resistance to the infection. We have no accurate means for determining the latter, and he suggests the three months' course on empirical grounds. Many physicians recommend much shorter courses, but this probably means a greater risk of relapse after the end of the course; and if a relapse does occur the whole course must be taken over again.

The Therapeutics of the Rheumatic Child.

In the *Medical Times* for November, 1925, EPSTEIN expresses his belief that the therapeutics of the rheumatic child consists essentially of three kinds of prevention: Prevention of rheumatic infection of those children who are predisposed to it, prevention of a recurrence in those who have already had an attack of rheumatism, and prevention of the heart from becoming involved in the rheumatic mêlée. For pre-

ventive as well as for curative purposes, treatment may be divided into general, hygienic, and medicinal.

A child with a rheumatic diathesis, or one that already harbors the rheumatic infection, should have his health built up and maintained in a normal condition. Flannel or woolen underclothing, protection of the feet from chilling and dampness, and the avoidance of exposure to cold and inclement weather, are of the utmost importance. If circumstances permit, a rheumatic child should live in a dry, warm climate. Much can be done by improving the condition of the poor. There is undoubted evidence that many cases of rheumatism had their inception in a cold, damp house, scanty clothing, and general poverty. In rheumatism, prevention is the safest cure.

The nasal and the oral tracts should be put in a healthy condition. Carious teeth and ill looking tonsils must be removed. No tonsils need be condemned to slaughter simply because they happen to be there. An alkaline antiseptic mouth-wash and gargle should be used routinely. The bowels should receive proper care. A daily warm bath is essential.

Rheumatism is an ancient disease and the salicylates are old remedies. Time has sanctioned their use, though their exact pharmacological action is still undetermined. Sodium salicylate with or without sodium bicarbonate in a palatable solution should be kept as a household remedy. On the slightest complaint which is diagnostic or suggestive of rheumatism, salicylate in the proper dosage should be given for a day or two, the child being kept in bed or indoors. In cold, damp and rainy weather, children who are predisposed to or have had an attack of rheumatism should receive some salicylate as a prophylactic measure.

When there is fever with polyarthritis, or any of the other symptoms and signs of acute rheumatism, the child should be put to bed in a warm, airy room until every symptom of the disease has subsided and the pulse shows no increased rate or disturbed rhythm. Proper nursing and tepid sponge baths are important.

There is no special diet suitable for rheumatic children. The prevailing practice of a meatless diet has no scientific basis. On general principles the diet should be limited to milk, cereals, toast and butter. Plenty of water should be given either plain or as lemonade or orangeade. When convalescence begins, the diet should be more liberal with the addition of eggs and meat.

Quite a number of drugs are being used to combat the rheumatic infection. Sodium salicylate, aspirin, salicin, salophen and salol are commonly prescribed. Sodium bicarbonate, potassium citrate and the alkaline waters are also frequently used. Sodium salicylate with or without sodium bicarbonate is probably best. Small frequent doses are better borne by a child than large doses which are depressant and harmful. If aspirin is prescribed, it should not be combined with sodium bicarbonate as is commonly done; they are incompatible.

Codeine and phenacetine may be given to relieve pain. The usual practice of applying to the painful joints ointments containing oil of wintergreen, camphor, menthol or ichthyol is of doubtful value. They are uncleanly and give to the sick-room a pungent, penetrating, disagreeable smell. The application to the joints of clean cotton wadding to keep them warm and at rest is all that is necessary.

When the acute symptoms are over, quinine salicylate with iron carbonate saccharated will do much good. It is good therapeutics to keep the child for months after an acute attack on some form of salicylate, given once at night, to keep the body salicylated. Serums and vaccines have, so far, not proven their worth.

Much confusion exists in the diagnosis of chronic rheumatism. It is a common, ill-defined, misleading diagnosis. Acute rheumatism, or acute rheumatic fever, does not lead to chronicity and does not merge into any other disease. In a subacute form it may drag on for months in various ways and manifestations.

Unfortunately all aches and pains, whether muscular, arthritic, synovial, or neutral, are lumped together under a diagnosis or rheumatism. Chronic joint affections may be traumatic, infectious, toxic, or metabolic,

and should be diagnosed as arthritis and not rheumatism. A chronic polyarthritis in children is occasionally seen and is known as Still's disease. It is characterized by a periarthritis, glandular and splenic enlargement. Osteoarthritis or arthritis deformans of obscure etiology may also occur in children.

The treatment of the various types of arthritis depends upon the underlying condition. Where the etiology is unknown, Fowler's solution with syrup of iodide of iron may be given. Diathermy, massage and other forms of physiotherapy should be tried. Vaccines may be useful.

Bismuth Treatment of Syphilis When Arsenic Fails.

RAMOS, in the *Medical Times* for November, 1925, states that from the old and new cases which he has treated, he believes that we have in x-iodo-bismuth (and for that matter probably in other bismuth preparations) a spirochetal agent which if not quite as rapid in healing primary lesions as arsphenamine and its associates, is more permanent in its cure of syphilis. It is certainly superior to mercury, and is especially convenient to use in children, the aged, the weakly, and patients who do not tolerate arsphenamine, or in cases in which the veins are difficult to find or so small that the nervous excitement brought about by the dread of intravenous injections renders it undesirable. We have in it an equally efficient spirocheticidal means of treating such patients.

As a prophylactic measure against recurrence in newly acquired infections it should be used on general principles, alternating with arsphenamine intravenous injections every third day.

While it is far too early to make any positive statement as to whether this will protect the patient or whether any treatment protects the patient against the cerebrospinal invasion of the trepenoma pallida later in life, it is worth a trial, for in all new cases treated by him on these lines he obtains negative Wassermanns and clinical cures without relapses or any suggestion of cerebrospinal sequences.

In old neglected cases, or those which have been treated for years by the older methods, he has not always obtained Wassermann blood negative results, but all patients were clinically improved and many became permanently blood negative, which was not the case during the years they had been treated with arsphenamine, mercury, and iodide.

The Treatment of Early Paronychia.

In the *Boston Medical and Surgical Journal* of November 5, 1925, COUES states that acute paronychia—pus around the nail-bed—though ordinarily regarded as one of the more trivial types of infection of the hand, leads oftentimes to weeks of disability in the worker, economic loss, and occasionally, in neglected cases, or those treated injudiciously, to serious and sometimes crippling results. Early intelligent treatment may undoubtedly save, at times, some weeks of disability and the necessity of the radical operation of Kanavel or some modification of it. To those familiar with this type of surgery, nothing new is offered in the following remarks; but it is hoped that the suggestions made as to early treatment may be of value to those seeing these cases in their general practice.

The object of early treatment is, of course, to arrest the paronychia before pus is infiltrated between the superficial nail and the matrix to such an extent that a formal operation is necessary for the cure of the condition. The surgical "don'ts" at this stage are most important and are often neglected. A lateral incision of the finger over the seat of greatest redness and tenderness often resorted to will not cure the condition, except perhaps only in the case of a pure subepithelial abscess on the side of the finger, and not true paronychia. The surgeon is at times tempted to incise laterally, and often is rewarded by finding a few drops of pus. Nevertheless, the inflammatory process under the nail still keeps on, and sooner or later a removal of the nail

must be done to effect a cure. So-called "wet dressings" are, of course, a fallacy unless definite instructions are given to the patient or his family as to keeping them wet at home. A hot moist dressing applied in the office or clinic will be dry in a few hours and will cause irritation. The usual findings the next day after this sort of dressing is applied are a hot, red, throbbing finger with dry gauze adherent to it, and, if lateral incision has been made, the tiny wick used is found forced out upon the dressing. A full-blown paronychia is in progress, which will not yield to anything but radical cure by proper surgery. Early paronychia can, however, with proper treatment, be arrested and cure be brought about in a few days' time in many cases. The method of procedure which has given satisfactory results in a number of early cases is as follows:

Beginning at the edge of the nail where the infiltration and redness are most marked, a very fine sterile probe or the blunt end of a large surgical needle is pushed gently under the cuticle and worked down around the border of the nail, lifting the cuticle gently up. Often a few drops of pus will be liberated by this procedure. Next a very fine narrow ribbon of sterile rubber is carefully pressed in place in this small pocket, care being taken that the rubber tissue ribbon does not stamp on this place. The end of the finger is smeared with sterile vaselin and a small square of rubber tissue, with a small hole in the center, is placed over the end of the finger, this tending to macerate and keep the skin soft. Moist gauze is then applied and a short finger splint. The patient is instructed to keep the dressing wet with warm salt solution at home, dripping it through the outer dressing every hour or so.

In favorable cases, at the next visit the finger is found soft, the redness and tenderness gone or nearly gone, and repetition of the treatment for from two to three days may result in a cure without the necessity of the removal of the nail. Protection of the finger for a few days longer is all that is necessary after this. Such treatment is always worthy of trial in the early cases, but experience tells us very quickly which cases are likely to respond to this conservative method. It has been shown that it is unwise to proceed to radical operation in early cases before such simple measures are tried for a few days. Hot baths for the hand and arm at the office or clinic enhance the beneficial effects of this treatment.

In elderly people, with repeated paronychias, it is always wise to have a careful urine examination made with especial reference to the presence of sugar. The surgeon should always have in mind in typical cases that rare and fatal condition known as melanoma of the nail-bed, a number of cases of which have been reported in recent surgical literature.

Protein Milks in Infant Feeding.

In the *Archives of Pediatrics* for November, 1925, BLENKLE recalls the fact that prior to 1910, protein was looked upon as one of the outstanding factors at the bottom of infantile nutritional disturbances. It was believed in general that infants had a low tolerance toward protein. That year Meyer reported the surprising results of a unique clinical experiment. He found that infants thrived on cow's milk casein and mother's milk whey, whereas when fed on cow's milk whey and mother's milk casein the same intestinal disturbances encountered on ordinary milk mixtures occurred. This interested Finkelstein, with the result that he evolved a protein milk from his experiments, basing its wonderful results on the theory that the carbohydrates in the food were really the cause of the majority of nutritional upsets and that the infant had a high tolerance for protein, the presence of which even favorably influences the tolerances for sugar and fat. Protein milk is indicated in any infantile diarrhea case and is useful in all nutritional disturbances of infants.

Because of its difficulty of preparation, powdered protein milks were prepared. These can be kept over long periods of time, are obtainable everywhere, easily and more quickly prepared, cheaper and easily made at home. They do not block the nipple and

the curd remains longer in suspension. Many of the preparations do not require sieving nor addition of milk, most are bacteria free, and some keep without refrigeration. Powdered protein milk also gives a fairly uniform product. Some go so far as to include a satisfaction of the lactic acid principle of Marriott and the preservation of the vitamins present, one preparation even containing added vitamins. They have all proven themselves worthy of replacing Finkelstein's preparation, when advantageous in the particular case.

Blood Transfusion.

In the *United States Naval Medical Bulletin* for November, 1925, THORNTON asserts that the relative merits of unmodified blood and blood modified by means of sodium citrate is one of the questions of active interest in connection with blood transfusion.

One of the differences between unmodified and citrated blood is manifested clinically by the more frequent occurrence of reactions with the latter method. Drinker and Brittingham state that after citrated blood transfusion, febrile attacks occur in 60 per cent of cases and a chill in 57 per cent. In Unger's series of cases transfused with whole or unmodified blood, febrile reactions occurred in 10 per cent of cases and a chill in about 3 per cent. This difference in the proportion of disagreeable reactions has been shown by Drinker and Brittingham to be due to changes in the blood platelets which have undergone alterations coincident with early coagulation. Such changes are almost unavoidable in citrated blood transfusions.

Unger has shown also that the addition of sodium citrate to the blood causes an abnormality of the red cells, evidenced by an increased fragility and tendency to hemolysis.

Bernheim, who a short time ago maintained the position that because of its simplicity the citrate method rendered all other methods superfluous, has recently expressed quite the opposite opinion. He wrote:

"In the light of our more mature experience, it is utterly ridiculous to pretend any longer that the reactions that follow the giving of citrated blood are harmless and susceptible to being ignored. Chills and fever and profound shock have never helped any one and to ignore the danger of these sequelæ . . . is little more than admitting a mind closed to certain embarrassing features connected with the procedure . . . The dread reactions still persist . . . despite the most carefully planned and executed citrate transfusions carried out by men whose long experience with general blood transfusions would preclude the possibility of technical error . . . Deaths following reactions from citrate transfusions can no longer be considered as accidental and unrelated to the reaction . . . I have had two deaths from this method of transfusion and I have personal knowledge of about four additional unreported deaths, not to mention numerous other miraculous escapes from death, and I feel quite sure that the experience of many others has been not unlike my own."

Because of such clinical evidence, laboratory experiments were undertaken to investigate the difference between modified (citrated) and unmodified blood, and it was shown that the plasma from the citrated blood was anticomplementary. An anticomplementary reaction signifies that a substance is present which of itself is able to inactivate complement. This substance is not the sodium citrate itself, nor is it derived from the direct action of the sodium citrate on the serum. These two possibilities were eliminated by control Wassermann tests with the citrate alone and with the serum to which citrate had been added.

The inference, therefore, is that this action took place directly on the cellular elements of the blood. Further experiments were performed to see whether the salt acted directly upon the complement. These consisted of titrating human serum for its complement content, and again titrating after sodium citrate had been added in an amount equal to that used in transfusions. Such tests demonstrated that sodium citrate affects

the complement directly, diminishing its amount.

When a citrate transfusion is performed, therefore, blood is being given in which the complement has been diminished in two ways—first, by the production of an anti-complementary substance which inactivates some of the available complement, and, second, by a direct destructive action. This is of clinical importance since one of the indications for transfusion is infection, local and general, and complement is a vital factor in the defense against pathogenic organisms. It plays an important rôle in destroying bacteria. The experiment of Wassermann which showed that anticomplement may unite with complement, rendering the individual susceptible to certain infectious diseases, may be recalled.

Another well-recognized method of defense against pathogenic organisms is the phagocytic power of white blood cells. As is well known, blood cells free of serum have very little ability to ingest bacteria. However, after bacteria have been acted on by opsonins in serum, they can be ingested by leucocytes. Tests were performed to compare the phagocytic power of white cells as given in transposed or unmodified blood with similar cells given in citrated blood. As the result of tests of normal white cells it was found that donors may be divided into two groups—those whose cells ingest an average of about 18 bacteria, and those ingesting about six. If cells of the former group are treated with sodium citrate, the number of bacteria ingested is reduced to about five, and if the cells of the latter group are similarly treated the average is reduced to about three. This shows that sodium citrate markedly reduces the phagocytic power of the white cells.

Opsonins in serum were next tested in a similar manner. In one series serum was employed, and in another citrated plasma, normal unmodified white blood cells being used in both. Cells which with normal serum can ingest about 18 bacteria can ingest only about four when citrated plasma is employed. Cells which in normal serum ingest about six bacteria can ingest about two when citrated plasma is employed.

The opsonins in the blood are, therefore, greatly interfered with by the addition of sodium citrate. This marked reduction of the power of the blood plasma to prepare bacteria for ingestion and the great destruction of the inherent power of the white blood cells to ingest bacteria render citrated blood of less value than unmodified blood when transfusion is employed to combat infection.

In cases of infection when transfusion is indicated, unmodified blood should be used, and a donor selected whose phagocytic index is high.

Prevention of the Common Cold.

In an editorial on this subject, the *British Medical Journal* of November 14, 1925, states that the chief subject discussed by the Medical Officers of Schools Association at its meeting on November 6 was the prophylaxis of common colds in schools by means of preventive inoculation with a vaccine. A boarding-school provides an excellent place in which to assess the value of this form of treatment, because those who have been vaccinated can be watched for some time, and because external conditions which affect such a comparatively isolated population can usually be recorded. There have been instances in which vaccination against coryza has been conducted with the rigorous control demanded of a scientific experiment, but these have not been on a large enough scale nor led to sufficiently unequivocal results to convince the skeptical.

Many of the experienced school medical officers who took part in this discussion obviously have faith in prophylactic vaccination against colds, and some could point to successful mass inoculations. When, however, the lack of precise knowledge about dose, optimum time of inoculation, repetition of doses, and duration of immunity after anticatarrh vaccines is compared with the well-founded knowledge about other forms of vaccination—as, for instance,

against typhoid fever—we realize that hesitancy and lack of confidence are not out of place. Nor should it be forgotten that no single *causa causans* of the group of infections loosely labeled as coryza has as yet been identified.

With so many uncertain factors it is not surprising that opinions differ, and the meeting did wisely in recommending the council of the association to set up a subcommittee to investigate the best methods of preventing infectious catarrhs in schools. The subcommittee will perform an important public service if it collects and reviews the literature of previous attempts in this direction, and after sifting the evidence draws up a workable plan for putting vaccination against colds to the test on a large scale. The uncertainty which exists about this more technical method of prevention naturally resulted in greater prominence being given to vaccination than to other and better established means of prophylaxis. But such important measures as nasal and aural hygiene, avoidance of over-crowding, and attention to proper ventilation and clothing, must not be relegated to a subordinate position. These are well-tried common-sense precautions, and it would be a pity if hopes based on the possible value of a few thousand million microbes in a bottle should induce any school medical officer to neglect rational measures which have proved their worth.

Tooth Destruction in the Pregnant Woman and How to Control It.

In the *Journal of the Missouri State Medical Association* for November, 1925, KERWIN states that in order to maintain a high calcium balance he gives every woman who applies for prenatal care calcium lactate in five-grain doses twice daily. This is continued throughout her pregnancy in the hope of not only protecting the mother, but also of giving to the child a good set of primary teeth and good bones. The diet of the American people is scant in calcium salts. Williams, to protect the pregnant woman against the loss of calcium, advised the consumption of one pint of cow's milk during pregnancy.

Rawley made a study of the teeth of pregnant women and found that certain cases of vomiting and toxemia are due to periapical infection and that the removal of the diseased teeth cures some cases. He recommends roentgenologic examination of the teeth during pregnancy where there are any complications. If periapical infection is diagnosed, or caries are extensive enough to warrent devitalization, extraction is preferred to reconstructive dentistry. Cultures from roots of devitalized teeth consistently show a positive growth of streptococci (either viridans or hemolytic type). Pyorrhea should not be overlooked, and cavities in vital teeth should be filled with cement rather than permanent materials.

Reactions resulting from extraction should be observed by temperature readings, urine and leucocyte examinations. Goodman concurs in this opinion. Waller contends that dental disease militates against successful breast feeding. He was able to improve the milk of the breast in eighty per cent of the patients where dental sepsis could be held responsible. It is his routine to have the pregnant patient see her dentist and have all necessary dental work done, and in several hundred private cases no ill results have occurred. The old fear of dentistry on the pregnant woman has become obsolete.

How can the obstetrician help to improve the condition of the teeth? (1) By urging the use of alkaline mouth-washes during pregnancy. This should be done several times daily and especially after each vomiting spell. (2) By supervising the diet of the pregnant woman and prescribing calcium throughout pregnancy. (3) By seeking the early coöperation of the pediatrician so as to insure the proper diet for the growing child. (4) By coöperating with the dentist where the woman shows defective teeth.

He concludes that (1) pregnancy claims a high toll in tooth expenditure. (2) Tooth destruction in the pregnant woman is due to an acid saliva. (3) The tooth can be preserved at this time. (4) All necessary dentistry during pregnancy should be done

regardless of the duration of pregnancy. (5) To aim at tooth preservation is one of the obstetrician's duties. (6) Better teeth can be given to the new-born by proper prenatal care. (7) Pregnant women should use frequently an alkaline mouth-wash and take calcium throughout the pregnancy.

The Pharmacology of Veratrum Viride with Certain Therapeutic Suggestions.

In *Southern Medicine and Surgery* for November, 1925, MACNIDER says that his experiments even in their unfinished state permit certain deductions which are as follows:

1. Veratrum when properly given is not a dangerous drug, for it may be given to animals even by the intravenous method without injury.

2. Both the older and the younger groups of physicians have an element of truth in their attitude toward the drug. If veratrum is given in therapeutic doses it slows the heart in a perfectly safe manner by stimulating the vagus or inhibitory center. This action together with its effect on the blood-vessel wall causes a distinct and, furthermore, a prolonged fall in blood-pressure. If this slowing of the heart and the associated fall in blood-pressure is excessive, it can be relieved by giving atropine sulphate hypodermically, which depresses the vagus nerve endings in the heart muscle and prevents the slowing or inhibitory impulses from reaching the heart. The heart-beat accelerates, more blood is put into the vessels, and through this action and perhaps other influences blood-pressure rises. If on the other hand veratrum is given in excessive doses so that its toxic but not therapeutic effect is obtained, we get a secondary slowing of the heart and a marked fall in blood-pressure which may be dangerous. This secondary and toxic slowing is not a safe slowing, for it is due to a depression of the heart muscle. It cannot be relieved by atropine, but it can usually be relieved by the intravenous use of adrenalin, which increases the rate of the heart by acting on the endings of its sympathetic nervous mechanism.

He thinks it is not within the province of his paper to discuss the therapeutic use of veratrum. He has not had the clinical experience to justify such a discussion. The following suggestion is, however, made. In patients with arteriosclerosis and also in patients without this pathology there frequently occurs a gradual or a sudden rise in blood-pressure which may be dangerous. The heart is usually beating fast and putting an excessive amount of blood into vessels which are overconstricted by a spasm of their involuntary muscle tissue which may or may not be superimposed on a chronic arteriosclerotic process. Veratrum, and likely no other drug, can remove fibrous tissue or areas of calcification, increase the bore of such vessels, and lower blood-pressure. Such an assumption would be foolish. It can, however, safely influence the rate of the heart so that less blood is put out into the vessels, and it can, furthermore, relax the overconstricted muscle tissue of the vessel walls. Through this action it reduces blood-pressure, and he believes it should be of distinct therapeutic value in selected cases of high systolic pressure, in which a spasm of the vessel wall, a functional condition, and not fibrosis of the vessel wall, a structural change, is in large measure responsible for a systolic pressure which may do harm.

The Effect on the Enzyme Concentration of the Duodenum by Oral Use of Commercial Pancreatic Preparations.

In the *American Journal of the Medical Sciences* for November, 1925, SILVERMAN, DENIS, and LECHE state that in a series of observations made on the digestive power of raw beef pancreas and of four commercial pancreatic preparations their results were as follows:

When tested *in vitro* all preparations showed digestive activity as regards proteolytic and lipolytic actions, but one seemed lacking in ability to split cooked starch under these experimental conditions.

In vivo the most striking effect noted was a marked increase in proteolytic activity,

although in certain preparations a moderate increase in the ability of the duodenal secretion to split starch and emulsified fat was noted.

In interpreting the difference in the results obtained in the *in vitro* experiments as contrasted with those obtained on the administration of the preparations by mouth one must consider the possibility of stimulation of pancreatic secretion by these preparations as distinguished from the simple increase in the enzymotic concentration of the duodenal contents produced by the enzymes contained in the amount of gland substance taken.

The results presented may, they believe, be interpreted as furnishing experimental proof of the fact that pancreatic preparations taken by mouth increase the digestive power of the duodenal contents.

Novasurol: A New Diuretic.

In the *Lancet* of November 14, 1925, GILCHRIST states that novasurol is a diuretic of great value in cardiac failure. It appears to be of greater potency and certainty than any of the other diuretics in common use.

When employed with digitalis each enhances the other's action.

It is suggested that cases which do not respond to the drug have a very low vital capacity, and it is unlikely that any diuretic would be helpful to such hearts.

Diagnosis and Treatment of Hypertension.

In the *Journal-Lancet* for November, 1925, ULRICH states that the treatment of nephritis is essentially different from hypertension. In nephritis we need rest and a low protein diet; in hypertension, while rest is essential, it is only measured by the efficiency of the heart. There is no particular diet in hypertension, except one which will bring about the greatest efficiency of the patient. This is by no means a low protein diet. The tendency to starve these patients is a prevalent custom. Starvation reduces cardiac efficiency, of course, and with its reduction often a fall of pressure is noted. The patient's pressure is improved, but his condition is in reality worse. His cardiac reserve has been reduced. Of course, overweight people need reduction in weight, and a suitable diet toward this end is advisable. An undernourished man should be fattened by appropriate measures. The salt-free diet of Allen is certainly to be condemned as inadequate. Salt retention has nothing to do with hypertension.

How to combat the vascular accidents of hypertension is not known. Accurate and prolonged observation of a case will tell one pretty closely which way the factor toward death is working. Sixty to eighty per cent of the hypertensives will go by way of heart failure. The superimposed factors of senile changes in vessels already sclerosed by hyperfunction are too subtle to combat. There is only one outstanding factor which may put off but not prevent vascular accident. It is the constant reiteration of the advice to avoid all excitement, all sudden or prolonged exertion, all situations which demand quick mental or physical changes. It is needless to say that such a rule implies a reëducation of the patient's habits—a bit of therapy which is almost superhuman.

The Potentiation of Novocaine Solutions.

In the *Journal of Laboratory and Clinical Medicine* for November, 1925, MEEKER reports upon the various substances proposed for the improvement of the novocaine solution. Magnesium sulphate, sodium sulphate, sodium bicarbonate and gelatin have no local anesthetic action alone. Calcium chloride and potassium salts are weakly anesthetic. Chloretone and quinine urea hydrochloride are recognized as local anesthetic drugs.

In surface anesthesia true potentiation was observed only by the addition of alkali, either sodium or potassium bicarbonate, to the novocaine solution. By this means novocaine can be made almost the equal of cocaine in mucous membrane anesthesia. While this feature has been pointed out by other investigators, the novocaine-

bicarbonate mixture seems not to have been employed in clinical use. It is recommended that the mixture be given a trial in mucous membrane anesthesia of the eye, nose and throat, and urethra.

For injection anesthesia none of the substances proposed for improvement seem to have sufficient value to warrant their use. This is in marked contrast to the decisive prolongation of anesthetic action observed after the addition of adrenalin to the novocaine solution. Experimental results in this respect agree with the vast majority of clinical experience with local anesthetic methods.

Experimental and Clinical Investigation of Mercurochrome.

In the *Lancet* of November 14, 1925, TODD states that mercurochrome is a powerful antiseptic of low toxicity, rapid and deep penetrability, and causes little irritation. It does not precipitate albumins. If protected from light it is stable for long periods in normal saline solution.

Its antiseptic properties are augmented by acidity; they are diminished by increased density of solvent and are likely to be less apparent in heavy infections. Various strains of an organism show differences in susceptibility.

At acidities near to normality its antiseptic properties are relatively feeble and it is unlikely to be of value in general infections.

The Phenoltetrachlorphthalein Test as a Means of Determining Liver Function.

In the *Annals of Clinical Medicine* for November, 1925, FRIEDENWALD and MORGAN state that from their observations as well as from those of others regarding the value of the phenoltetrachlorphthalein test applied according to the Rosenthal method, they believe the following conclusions may safely be drawn:

This test is a valuable means of determining liver function, for when injected intravenously it disappears rapidly under normal conditions at a uniform rate; while on the other hand a greater or less retention is noted corresponding to the degree of liver disturbance.

In catarrhal jaundice marked retention is noted, a condition which continues for a considerable period of time following the disappearance of the icterus, which strongly suggests that we are dealing in this condition with some distinct disturbance of the liver cells.

In cirrhosis of the liver, retention of the dye may occur to a greater or less degree. As Rosenthal and others have pointed out, due to the chronicity of the disease, the liver may undergo a reserve compensatory hyperplasia in consequence of which even with a more or less extensive lesion normal or nearly normal findings may be obtained.

In all instances of cancer of the liver retention occurs to a rather marked degree.

In syphilis of the liver retention of the dye may or may not occur, depending largely upon the degree of involvement.

In cancer of the pancreas with secondary liver involvement marked retention is ordinarily noted.

In chronic cholecystitis, cholelithiasis, and affections in which the liver itself is not severely involved, retention is never observed. This finding may be of value in the differential diagnosis between certain affections of the liver, gall-bladder, and extrahepatic lesions.

Finally from these observations it is evident that this test as simplified by Rosenthal is of considerable value as a means of determining liver function; it should be routinely performed whenever there is evidence of liver involvement since it offers much diagnostic aid.

Since they prepared this report the bromsulphalein test of Rosenthal and White has appeared. They have utilized this new test recently, and though their results have as yet been too few to draw final conclusions, they are of the opinion that it possesses considerable advantage over the tetrachlorphthalein. It is used in small dosage (2 mgm. per kilogram of body weight); is non-irritating to the wall of the vein and can be injected intravenously in concen-

trated solution. Normally, five minutes following the injection 20 to 50 per cent of the dye is obtained in the serum with an average of 35 per cent. In thirty minutes the serum is entirely free from the dye. In addition, the recent objections raised by Maurer and Gatewood to the "tetrachlorphthalein" test have been overcome by means of bromsulphalein, the latter being non-toxic in the dosage advised; it is removed from the blood current entirely by the liver and circulates in the blood in a soluble form.

Some Observations on Chronic Ulcerative Colitis.

BROWN, in the *Annals of Clinical Medicine* for November, 1925, well says that the treatment of chronic ulcerative colitis is peculiarly discouraging — apparent cure, whatever the agent used, is only too often followed by relapse.

He has usually prescribed a general diet, well cooked, often in purée form, well masticated, and usually low in cellulose, only eliminating foods that the individual has found aggravated the symptoms—in quite a few cases, milk by the way. Trying to change the flora with acidophilus milk has been devoid of success in his cases.

He has done everything to improve the patient's general condition—a proper climate, fresh air, sunshine, iron-arsenic hypodermics, etc., although he has seen no specific benefit from heliotherapy or the alpine light applied directly to the abdomen.

He has in his recent cases used iodine—sometimes by mouth, sometimes through the appendicostomy opening; but he has felt that its effect is not due so much to its bactericidal qualities as to its effect in slowing the pulse and improving the nutrition.

By the rectum, or through the appendicostomy, or cecostomy, opening, he has used many forms of irrigation: tap water or normal salt solution in most cases seems to have been as effective as antiseptics, such as potassium permanganate, while of the bactericidal or bacteriostatic dyes the only one that has proven helpful, and this only in a few instances, has been gentian violet; while mercurochrome has always proven very irritating and impossible to be continued on account of the great discomfort it has given the patient. Neutral acriflavine has not helped him appreciably. Protargol and argyrol have possibly lessened the symptoms temporarily in a few cases; enormous doses of bismuth by mouth or tannic acid irrigations have also seemed to help somewhat. The Chinese herb, Yatrin, he has not tried as yet, although he expects to do so. The fact that in certain cases the simple performance of an appendicostomy or cecostomy, with, *ipso facto*, the introduction of air into what before was an anaerobic medium, was followed by marked improvement, led him to use oxygen or hydrogen peroxide, both by rectum and by artificial opening, with, incidentally, no appreciable benefit.

Experiments in the Glomerular Distribution of Blood in the Mammalian Kidney.

In the *Journal of Experimental Medicine* for November, 1925, HAYMAN and STARR state that intravital staining of the glomeruli of the kidney can be accomplished by Janus green B, provided the solution of this dye be injected into the aorta.

In a normal rabbit the two kidneys usually contain approximately the same number of glomeruli.

On the basis of these two observations, Nelson's method of estimating the number of glomeruli in a kidney has been adapted for showing the number of glomeruli which are open to the circulation at the moment of injection of the dye.

This adaptation has been used to determine the number of open glomeruli in the rabbit's kidney under various conditions. Wide variations in the number occur spontaneously and may be produced experimentally. Hence the extent of surface or glomerular membranes to which blood has access is variable.

Caffeine and salt solution, used as typical renal vasodilators, cause the number of open glomeruli to increase. All or nearly

all of the glomeruli are open during the action of these substances.

Vasoconstricting agents, such as adrenalin and CO_2 inhalations, usually reduce the number of glomeruli open to the circulation. If the vasoconstriction is pronounced the number of open glomeruli may be only 10 per cent or less of the total number in the kidney.

As a rule the number of open glomeruli, kidney volume, kidney blood flow, and urine elimination vary in the same direction; but there are exceptions to this generalization.

A decrease in kidney volume may be accompanied by one of the following vascular phenomena: (*a*) The number of open glomeruli may be reduced but the average blood flow per glomerulus continue high; (*b*) the number of open glomeruli may remain high, the constriction simply diminishing blood flow through them; (*c*) a reduction in number of open glomeruli may be accompanied by a reduced blood flow through those still remaining open. [Illustrates well the ebb and flow of kidney function in health and under drugs.—ED.]

Histological Changes Brought About in Cases of Exophthalmic Goitre by the Administration of Iodine.

In the *Bulletin of the Johns Hopkins Hospital* for November, 1925, RIENHOFF reports that iodine produces definite and striking changes in the histological structure of the thyroid gland in cases of exophthalmic goitre.

These changes are as follows: (*a*) Increase in size of the thyroid gland as a whole; (*b*) decrease in vascularity and probably in the lymph flow through the gland; (*c*) a large increase in amount of fibrous connective tissue; (*d*) a striking increase in amount of colloid deposited and contained within the thyroid gland; (*e*) a change in the acini from lace-like papillomatous ingrowths to round, even-walled smooth acini, regular in size and form; (*f*) a transition of epithelium from high columnar to flat cuboidal and occasionally low columnar; (*g*) a change in the nuclei of epithelial cells from large clear nuclei to the small irregular pycnotic type; (*h*) the presence of many mitotic figures before the use of iodine and their absence after iodine has been given.

The clinical improvement and the lowered rate of basal metabolism are directly associated with the change from a typical histological picture of exophthalmic goitre to a resting colloid state.

In comparing the histological structure of the thyroid gland in 30 cases of exophthalmic goitre, fifteen in which iodine had been given and fifteen in which no medication whatsoever had been used, it was observed that the histological picture following the administration of iodine was constant and, compared with the microscopical structure of the glands of the cases not receiving iodine, corresponded exactly, as had the microscopical changes in the three cases in which an examination of the gland was made in each patient before and after the administration of iodine.

The colloid state is proved clinically and histologically to be less active than the hypertrophic and hyperplastic state.

An artificial remission is produced by iodine.

A remission in a case of exophthalmic goitre is associated with a change in the histological picture from a hyperplastic to a colloid state, even though there is definite evidence of hyperplasia yet remaining. It is a question of a relative hyperplasia. This observation tends, he thinks, to clarify the confusing histological pictures seen in a long series of cases of exophthalmic goitre.

The Carbohydrate Metabolism of the Normal Infant.

TISDALL, DRAKE and BROWN, in the *American Journal of Diseases of Children* for November, 1925, state that from a review of the literature and their own results, it would appear that the average fasting blood-sugar concentration in normal infants usually does not vary more than from 0.075 to 0.095 per cent. In the sixty-eight cases which they reported, the average value found was 0.085 per cent.

The subcutaneous injection of 10 cc. per pound of body weight of a 5-per-cent solution of glucose produced only a slight rise in the blood-sugar concentration. The use of 10- and 15-per-cent solutions of glucose caused the blood-sugar concentration to increase after an interval of one-half hour to about 0.225 per cent. The original level was again reached in from two to three hours.

The subcutaneous administration of a 10-per-cent solution of glucose has been carried out in several thousand cases with no local or general ill effect.

The intravenous administration of 10 cc. per pound of body weight of a 10-per-cent solution of glucose caused an increase in the blood-sugar level, which after an interval of one-half hour was at the average concentration of 0.290 per cent. The concentration of blood sugar decreased to the original fasting level in from one to one and a half hours after the injection. It is thus evident that the glucose was removed from the blood stream with rather surprising rapidity.

Only about 2 per cent of the injected glucose was excreted by the kidneys.

The injected fluid was also removed rapidly from the blood stream. Very little, if any, of the fluid was excreted by the kidneys during the two-hour interval following the administration. It would appear that the injected fluid was stored temporarily, at least, in the tissues.

The Carbohydrate Metabolism of the Marantic Infant.

TISDALL, DRAKE, and BROWN in the *American Journal of Diseases of Children* for December, 1925, state that there is no evidence from a review of the literature and from their own work that the marantic infant is not able to digest and absorb carbohydrate as readily as the normal infant.

The average concentration of the fasting blood sugar of the marantic infant is about 10 per cent lower than that of the normal infant.

From a review of the literature no evidence is found of any marked abnormality in the heat production of the marantic infant. Any increased heat production, considered on the basis of the mass of active protoplasmic tissue, apparently is in response to an increased heat loss, due to a lack of the normal insulating layer of fat.

When feeding the marantic infant, it should be remembered that on the basis of the mass of active protoplasmic tissue, 70 calories per pound per day for the marantic infant is the exact equivalent of 45 calories per pound per day for the normal infant.

From a review of the literature and their own work they conclude there is no evidence of any abnormality of the general carbohydrate metabolism of the marantic infant, other than the lowered concentration of fasting blood sugar, and this is apparently the result of an inadequate reserve of glycogen.

Treatment of Puerperal Sepsis.

In the *British Medical Journal* of December 12, 1925, WATSON, in addressing the Edinburgh Obstetrical Society, said that methods for the treatment of puerperal sepsis could be divided into three main classes—prophylactic, specific, and non-specific. Prophylactic treatment was all-important, since even weakly virulent organisms throve on unhealthy tissues. It was therefore of the utmost urgency to maintain the prospective mother in the healthiest condition during her pregnancy, and this required adequate antenatal supervision and care. Any toxic foci in the body, such as infected teeth or tonsils, should be looked for and treated, since these might become active during the puerperium and give rise to localization of the causal organisms in the genital tract or cause dissemination into the blood stream. With regard to the elimination of pathogenic organisms from the vagina, it appeared that even douching with lactic acid had given on the whole no good results. On the other hand, purulent discharges should be investigated and treated as early in pregnancy as possible. Prophylactic vaccine therapy had not been so efficient as might have been expected; this was probably due to the

number of germs involved in puerperal sepsis, and also to the fact that little antibody was produced. If, however, definite organisms were known to be present before labor, then an autogenous vaccine might prove of benefit.

In the treatment of puerperal fever fresh air, sunlight, and good nursing are essential. Balcony accommodation should be provided, if possible, in the septic wing of all hospitals. The patient should be nursed in the Fowler position so as to allow free drainage. Specific therapy, which includes vaccine and serum therapy, had proved beneficial in some cases, but statistics showed that it had not proved of great use in any large number of cases. Antistreptococcal serum is perhaps the favorite remedy in this class, but it must be given early and in large doses, since it is useless when there is a massive blood infection or if thrombophlebitis has occurred. The treatment under this heading which seems to offer the greatest possibilities of success at the present time is immunotransfusion, the patient being transfused with blood from a donor who has been previously immunized with a stock vaccine; the immunization should be arranged three hours before the transfusion to give the best result.

Many remedies have been used by different authorities in the non-specific treatment of puerperal sepsis. The majority depended on the protein reaction, which is threefold —local, focal, and general; the last named gives rise to a temporary leucopenia, followed by a marked leucocytosis, which is believed to be the principal therapeutic agent. Milk, casein, and gelatin have been advised, but the dosage is difficult to determine, and on this account the treatment can only be undertaken under expert supervision. Arsenobenzol has proved beneficial in some cases when given intravenously, and quinine administered intravenously and intramuscularly has its advocates, its benefit being probably due in many cases to the formation of a fixation abscess.

Summarizing the treatment of puerperal sepsis, Watson said that a careful general examination must always be made to exclude any other cause of the fever. The odor of the lochial pad must be noted, the state of the uterus determined by abdominal palpation, and the perineum be inspected. Quinine should be given orally, and the patient be placed in Fowler's position near an open window. If there is no improvement in twenty-four hours cultures should be prepared from the uterus and blood, and antistreptococcal serum, 50 cc., be given intramuscularly or intravenously; this should be repeated in twelve hours, and then daily. Quinine or arsenobenzol might be given intravenously as well. If the fever still persists a vaginal examination should be made to exclude any local focus which requires surgical treatment. All cases should be treated in hospital under the care of an obstetrician aided by an expert bacteriologist.

Tetany as a Cause of Convulsions in Whooping-cough.

In the *American Journal of Diseases of Children* for November, 1925, POWERS states that the calcium concentration of the blood and the electrical reactions of all infants with whooping-cough should be determined if possible, and therapeusis guided by the evidence for or against the existence of latent tetany. In the event that these determinations cannot be made, calcium chloride should be administered to young children who have whooping-cough complicated by convulsions, even if there is no clinical evidence of tetany and rickets; exception to this procedure might be made, of course, in those patients with proved cerebral lesions. Furthermore, it would seem highly advisable, regardless of clinical signs or of laboratory data, to treat all infants suffering from whooping-cough with cod-liver oil or radiant energy or both. Even when uncomplicated, the infection is often severe and the therapeutic measures just mentioned will not only prevent and cure rickets on which infantile tetany is usually, if not always, engrafted, but also promote general physical welfare more effectively than any so-called "tonic remedies." As is well recognized, infections of

any kind are particularly severe in patients with rickets and its frequent associates, tetany and anemia. The prognosis for those infants with whooping-cough complicated by convulsions should be improved by appropriate treatment if the attacks are due to tetany, although the outlook may still be grave.

The convulsions which frequently complicate pertussis in babies are often manifestations of infantile tetany.

Electrical hyperirritability of the nerves and a reduced calcium concentration of the blood serum may be the only means of recognizing the existence of tetany.

A recognition of the rôle of tetany in this connection is important, in order that appropriate therapy for preventive as well as for curative purposes may be instituted.

Morphine-scopolamine Analgesia in Obstetrics.

In *Northwest Medicine* for November, 1925, HOLMAN claims that morphine-scopolamine narcosis lessens pain caused by first-stage uterine contraction in all cases and gives complete amnesia in most cases.

It is indicated in all normal primiparæ and in multiparæ in whom a long labor is expected.

It is contraindicated in cases in which operative interference is necessary.

It requires the most careful supervision.

If correctly used, it has no deleterious effect on the mother or baby.

Eye-strain.

In the *Medical Journal and Record* of December 2, 1925, OSBORNE suggests the following questions for developing the relation of the eyes to the disability:

1. At what age did the headaches first occur?

2. What is the frequency of the attacks of headache, and what is the exact work or play after which they occur?

3. What is the time of day at which the headache develops, especially the relation of the headache to arising in the morning, or to the work or pleasure of the evening before?

4. What is the relation of the headache to close eye work? What is the relation of the headache to an evening at the theater, or at the movies?

5. Whether or not the person has a growing dislike for reading, sewing, playing cards, shopping, crowds, parades, ball games, trolley riding, train riding, automobiling, theaters, and moving pictures.

6. Whether there is a history of car sickness.

7. What are the associated symptoms of the headache, as anorexia (or often the reverse, several hours before the headache a craving for food), or nausea or vomiting?

8. How soon after vomiting does the headache cease, and is the patient soon able to eat a good meal? Such an immediate appetite is of frequent occurrence, and completely rules out acute indigestion or an acute stomach disturbance. The reflex indigestion that is caused by the eye-strain may allow food to remain in the stomach and be vomited hours, even twelve or more, after it has been ingested.

9. Whether or not there are any heart symptoms with the headache? Some eye-strain patients have waves of nausea and sensations of fainting. They often have palpitation, and have, or imagine they have, heart pains.

10. Whether or not there is insomnia? Many patients cannot sleep, lose appetite and weight, and are supposed to suffer from so-called nervous exhaustion, with headaches and insomnia as important symptoms.

11. Whether or not there is history of dizziness? Some patients with eye-strain have queer spells, become dizzy and faint, sway on the street, and walk sidewise. He has had several such cases cured by correct glasses after long previous unsuccessful treatment of all kinds.

12. Bifocal lenses may be entirely inappropriate for the individual, especially when he is out and about. Many a patient cannot drive a car while he is wearing bifocal lenses, or cannot use them for his daily work. Also not infrequently the magnify-

ing lenses of the bifocals are misplaced; they are too high or too low, or too strong for mid-distance work. The reading lens is frequently utterly inappropriate for the work the person has to do. Two strengths of bifocals must frequently be given if the person is to be comfortable and symptomless. One bifocal should be of the proper strength for reading, and the other, a weaker bifocal, for all ordinary mid-distance use of the eyes.

Comparative Sugar Content of Blood and of Cerebrospinal Fluid in Various Conditions.

In the *American Journal of Diseases of Children* for December, 1925, LEVINSON tells us that the cerebrospinal fluid sugar in his series of non-meningitic fluids varied between 46 and 76 mg. per hundred cubic centimeters of fluid. The lowest figure (46 mg.) was obtained in a case of brain abscess, with a turbid fluid containing many leucocytes. The next lowest figure was 50 mg. per hundred cubic centimeters.

The cerebrospinal fluid sugar varied from day to day, and it bore no direct relation to the blood sugar.

The cerebrospinal fluid sugar in all forms of meningitis was low, varying from 45 mg. to a mere trace. In one case of meningococcus meningitis the sugar was unusually high a few hours after onset, but came down to 25 mg. in less than twenty-four hours.

The blood sugar in his cases of meningitis varied between 84 and 176 mg. per hundred cubic centimeters.

The sugar in the cerebrospinal fluid in a case of encephalitis showed an insignificant rise one hour after injection of glucose and a rise of 8 mg. three hours after the injection of glucose. Another time it showed a rise of 11 mg. in two and one-half hours.

There was a rise of from 4 to 7 mg. in the cerebrospinal fluid sugar in a case of tuberculous meningitis one hour after the injection of glucose. In one case there was a marked rise in the cerebrospinal fluid sugar two and one-half hours after injection (34 mg.) In another case the cerebrospinal fluid sugar was practically at the preinjection level. The same variation was true three hours after the injection of glucose.

Whenever possible, the sugar in cerebrospinal fluid should be determined on a specimen obtained several hours before the ingestion of food to exclude the possibility of error due to carbohydrate ingestion.

Levinson concludes for clinical purposes there is no special advantage in determining blood sugar along with cerebrospinal fluid sugar, but we may add that the cerebrospinal sugar may throw much light on the cause of the illness.

The Management of Scarlatinal Epidemics in Schools and Institutions.

In the *Proceedings of the Royal Society of Medicine* for December, 1925, WILSON states that the main difficulty in dealing with scarlatinal epidemics depends upon the fact that mild cases of the complaint often occur in which there are no characteristic symptoms or signs preceding the occurrence of an infective desquamation.

Therefore, whenever, in an epidemic, cases occur in which no contact with a previous case can be established, the presence must be suspected of some one suffering from scarlatinal desquamation without having had any recognizable signs of the complaint.

When this occurs inspection of the hands and feet of all inmates is called for.

To be effective the inspection must be repeated every six or seven days.

As the desquamation is very slight in these cases, not only must the inspection be made in a good light, but the hands and feet must be seen immediately after washing and before the skin has completely dried.

Progressive desquamation (which is non-scarlatinal) may be produced in certain children by the somewhat prolonged soaking of the feet which is necessitated by the inspection of a large number of children. This desquamation may be indistinguishable from that due to scarlet fever, and the risk

must be run of isolating these children along with the scarlatinal cases.

Other types of non-scarlatinal desquamation must be recognized.

When, in an epidemic, careful isolation of evident cases, and careful inspection of the children's hands and feet, do not suffice to stop the epidemic, all cases in which the patients are suffering from minor ailments which might be of scarlatinal origin (such as an attack of vomiting, sore throat, malaise, etc.) must be isolated and watched for two weeks or so, in order that it may be seen whether desquamation occurs.

Heliotherapy in Tuberculosis.

In the *Ohio State Medical Journal* for December, 1925, HYDE states that altitude is not an essential in obtaining good results from heliotherapy.

Rollier's method of progressive exposure of the whole body should be closely followed.

While its benefit to extrapulmonary forms of tuberculosis has been definitely shown, it should be used with great caution in pulmonary tuberculosis.

Heliotherapy is no more than an excellent adjuvant to rest, open air, and a good diet, and does not supersede them.

He asserts there is no lamp at present which can take the place of sunlight in the open air.

Problems in Venereal Prophylaxis.

In the *Medical Journal and Record* of December 2, 1925, ROUT well points out that many substances recommended as prophylactics are unsuitable or disagreeable. The meanest man or woman has some appreciation of sexual pleasure, and prophylactics which lessen pleasure will never be popular—therefore will be of little use in preventing disease. For example, calomel ointment is unsuitable internally for women; it causes salivation and irritation. Greasy substances used beforehand are thoroughly disliked, as being messy and uncomfortable, reducing friction and destroying direct contact. She has tried out various kinds of suppositories for years and found all of them unsatisfactory in different ways—usually because of stickiness or greasiness. For nearly two years she has been experimenting with different kinds of effervescing suppositories, and at last has attained success with a tablet which is being sent to Chicago as a prophylactic packet for women. Laboratory tests have shown that these prophylactic tablets will destroy the gonococci by contact in one minute—the weakest dilution of chinosol which kills the gonococci in one minute is one in four thousand; and the tablet gives approximately one to one thousand to one in two thousand, assuming an average amount of secretions. The tablet is stainless, odorless, tasteless, non-irritating, non-greasy, readily soluble in moisture but unaffected by heat—therefore of great value for tropical countries, where the ordinary cocoa-butter suppository is useless. After prolonged experimental research, in which she has been aided by bacteriologists, physicians, government analysts, and manufacturing chemists, and careful trial, she is now satisfied something has been evolved which will be acceptable to ordinary men and women for use before connection, when it will protect both parties; and if used afterwards only, it will help to protect women from infections in the genital passages.

Such a tablet, when properly packed, is readily portable; requires no apparatus; and does not affect sensation. If it could be put on sale as frankly and simply as tooth-paste or hair shampoo, fresh infections would certainly be largely reduced; and there is really no natural reason why prophylactics should not be sold as openly as tooth-brushes. We have long since ceased to rely on dirt and disease as aids to sanctity: why then do some of us still wish to found sex morality on them?

The training and experience of welfare workers in Chicago and New York seemed quite as inefficient and inadequate as in other English-speaking communities; and many of them obviously suffer from fixation of the brain cells. A disastrous development of welfare work is the setting

up of subsidized societies and colleges, endowed with subscriptions available only for moral suasion efforts. It is clearly the duty of honest welfare workers to prevent venereal diseases by all the means known to society. No advocate of prophylaxis dreams of underestimating the importance of self-control and constancy as factors in lessening risk: chastity is a positive, not a negative, virtue; society must provide for the normal sexual needs of its members; and the majority of men always have and always will regard women as indispensable to health and happiness. It is practical experience of life which teaches this. Therefore welfare workers should undergo training in the venereal disease clinics—public or private. She attended one private clinic in Chicago five hours a day for several weeks, where the infections were the result of ignorance, innocence, drunkenness, and sex appetite, the majority of the patients being taxi-drivers, policemen, industrial workers, shop girls, prostitutes, and pimps. Scarcely any of the men and none of the women had an adequate knowledge of prophylaxis, but they were all ready to listen to instruction and most of them anxious to acquire knowledge. One important feature was that the pimp brought in the prostitute he was running to see if she was free from disease, to learn how to keep her clean, and if found to be infected he arranged and paid for her continuous treatment. Thus the pimp has come to have a social value, as the medium through which medical supervision can be exercised where it is most needed. Women welfare workers are the most inexperienced as to the sex life of fair average collections of men and girls; and they almost entirely fail to realize the atom sorting processes to which humanity responds, whereby some women inevitably become prostitutes, some free lovers, some conventional wives and mothers, some foster parents, some neuter workers, some perverts, and some apparently repeat in their adult life the embryonic race history of their ancestors—from promiscuity to monogamy.

Rout asserts that the fundamental position is this, and till it is recognized no headway can be made: that the sexual possibilities of mankind are greater than the sexual requirements of permanent love and marriage. Therefore irregular intercourse is inevitable for imperfect humanity, and failure to make this irregular intercourse safe will result in making marriage the most dangerous of all our social institutions.

A-malairn in the Treatment of Chronic Malaria.

In the *Journal of the Royal Army Medical Corps* for December, 1925, SPENCER tells us that through the courtesy of the proprietors of the Chemical and Research Laboratories a supply of this drug was obtained for trial in India. The active principle of the drug is the glucoside of dioxydiamino - diphenyl - diarsenide. The cases which he reports were chosen specially for both severity of type and frequency of attacks, and were all bad cases of chronic relapsing benign tertian infection, which treatment by quinine and other drugs failed to improve. The object of the trial was to ascertain whether such a type of case could be materially benefited as regards liability to recurring attacks of active malaria. The drug was not used to treat actual attacks, but was given in definite courses with a view to ultimate and not immediate results. For this reason while quinine was withheld in the first cases treated, it was subsequently given when active symptoms were present. It is clear that in chronic infections, already the subjects of extensive quinine therapy, without improvement, its effects could neither enhance nor prejudice the results of the drug under trial. In the cases now reported a provocative effect has been noted in several instances, and it is doubtful if sterilization has been effected in any (possibly in two).

The history of each case has been followed as far as military conditions have allowed. The conditions as regards climate and temperature under which the tests have been made may be said to be ideally severe, as the altitude is 5500 feet, and severe cold at night follows upon high sun temperature

by day, while sudden changes in weather are frequent in the spring, all of which conditions are specially prone to cause recurrences of active symptoms in chronic benign tertian cases. Malignant tertian cases were excluded as it was considered this type would prove a less exacting test of the qualities of the drug. Treatment consisted of four weekly intramuscular injections of 1 cc., followed by a second course three months later.

He concludes that it would be unwise to attempt to express an opinion on the results of so few cases, but he is inclined to consider this drug one of the best combinations of arsenic he has used in the treatment of chronic malarial infections. Two of the cases treated had entirely failed to benefit from treatment by "Eoanophalie." While none of the cases responded immediately to treatment, all appear to have derived considerable ultimate benefit.

Spencer says that an official use of this drug on say fifty cases whose histories could be followed for two years after treatment would be of great interest and value.

The Value of Scopolamine-morphine Narcosis in Labor.

In *The Practitioner* for December, 1925, THEOBALD tells us of his experiences and says that as soon as the patient was put into the labor ward her ears were plugged with cotton-wool, kept in place by a flannel bandage which also covered the eyes. The preliminary dose consisted practically always of morphine sulphate, gr. ¼, and scopolamine hydrobromide, gr. 1/150. The morphine was repeated only in one case, when gr. 1/6 more was given. At first the succeeding doses of scopolamine were not given until he had carried out the amnesia test. He allowed the patient to feel three common objects, such as a penny, a fountain pen, or a button. After about a quarter of an hour he returned and asked her what she had handled. If her memory was clear an injection of scopolamine, gr. 1/450, was ordered. This system worked very well, but it was very exacting as far as the obstetrician was concerned. The ordinary work of the hospital had to be done, and not infrequently the success of the case was marred by the too long interval between his visits. He then laid down a routine that was to be carried out if he could not see the patient, and it proved much more successful than he had anticipated:

First Dose: Morphine sulphate, gr. ¼; Scopolamine hydrobromide, gr. 1/150.
Second Dose: Two hours after first dose: Scopolamine hydrobromide, gr. 1/225.

Subsequently scopolamine hydrobromide gr. 1/450 was given every three hours; it was also given when the head was on the perineum and delivery was expected.

Soon the amnesia test was discarded. It was found possible to judge the depth of narcosis by watching the patient, listening to her mutterings, and if necessary, talking to her. The sisters were then allowed to give scopolamine hydrobromide gr. 1/450 two-hourly if necessary, but in no case were they to give more than gr. 1/450. It thus came about that several of the cases were treated from the beginning to the end by the sisters, and were not seen by him.

Any increase in pulse rate or in the frequency of the respirations was to be noted, and regarded as a danger-signal. Neither of these signs was noted on any occasion.

The method seems quite safe, and not a single untoward symptom in the mother or the child was recorded. The convalescence of the patient was, if anything, accelerated and the duration of labor was shortened.

When it is realized that the ward was extremely noisy and in many respects unsuitable; that the nurse in charge of the patient was a pupil-midwife who was very rarely a trained nurse, and that practically every case was looked after by a new nurse; that the delivery was invariably attended by a crowd of students and conducted by a pupil-midwife; and that the perineum was subsequently sutured by a postgraduate student without any anesthetic, it is hard to form any opinion other than one of unqualified praise for twilight sleep.

It is preferable to carry out the treatment in a hospital or nursing-home, but Theobald asserts there is no reason why it should not be carried out in a private house if the services of a competent nurse can be

obtained, and the relatives are forewarned that the patient may make a great deal of noise. The routine treatment should not be started until the external os uteri is one quarter dilated, which may be ascertained by rectal examination. As the dosage is so much less than that hitherto suggested, the constant supervision of the obstetrician is unnecessary, providing he is absolutely assured that the case is normal. If he visits the patient four to six hours after the commencement of the treatment he can determine whether the subsequent doses of scopolamine should be given at two- or three-hourly intervals. Should the woman inadvertently come too far round, it is advisable to get her under again, using gr. 1/225 of scopolamine.

Under favorable circumstances the failure to obtain an "excellent" result will not be frequent. In any case, supposing the treatment absolutely fails, no great inconvenience has been caused, no great expense incurred, and above all, no risk either to the mother or to the child has been taken.

Tuberculosis Treated by Artificial Pneumothorax.

Writing in *The Practitioner* for December, 1925, OLIVER well says that since treatment by the induction of artificial pneumothorax has been carried out for several years, the question might well be asked, to what extent has it been curative of the disease for which it has been adopted? When the patches in diseased lungs have become softened and cavities have formed, the prospects of a patient living are not reassuring. Many operated upon have died within a year or two, but, on the other hand, it is the experience of Lillingston, Coley, and others that patients whose prospects of life were only a few months, or at the most a year or two, are alive to-day, twelve years or more after having submitted to the operation, and although we cannot speak of such results as a cure, the disease has been either arrested or has become quiescent, so that the patients are able to carry on in comfort and discharge their ordinary duties. This is as much as we can expect. The drawback to the treatment is that it has to be repeated time and again.

Rolland draws attention to the pathological changes found in lungs which have been compressed in artificial pneumothorax. During life radiograms indicate the march of events. Rolland examined the lungs of twenty-five patients upon whom the operation had been performed: eighteen of the patients died during the first year, fourteen of these within the first six months. Death in most instances was due to the pulmonary disease having become bilateral. In six of the cases death was attributed to perforation of the compressed lung. The lungs which had been compressed the longest supplied the most valuable information. In the healthy portions of the lungs which had been compressed there were areas of atelectasis, and in these it was found that the lung tissue had reverted to the fetal type; the epithelium had become cubical without any signs of sclerosis of lung tissue. On the other hand, around neighboring tuberculous or pneumonic patches there was distinct fibrosis. This, too, was the experience of Roubier, who found in six cases treated by artificial pneumothorax, where death had supervened from six to fifteen months after the operation, marked fibrosis of the pulmonary tissue surrounding old caseous masses. He did not find that the cavities became cicatrized by an approach of their walls. Cavities were observed which contained pus or caseating material, and while some tuberculous masses had become transformed into calcareous substance, there were indications of fresh foci of disease having developed both in the compressed lung and in that which previously to the operation had not shown signs of disease.

Pneumothorax has, therefore, in many instances arrested the disease by inducing a fibrosis, whereby extension of microorganisms to the healthy lung had been considerably prevented. Pneumothorax gives functional rest: the bronchi remain patent, and the air within them stagnant. While the operation brings about quiescence and

prevents ready extension of the disease, circumstances may occasionally arise whereby there is a lighting-up again of the malady, tubercle bacilli are liberated, and fresh infection takes place. Even with this possibility, where pneumothorax has been induced several years of useful life have been vouchsafed to many patients.

The Permanency of Hay-fever Cures.

In the *Medical Journal and Record* of December 2, 1925, SCHEPPEGRELL expresses the belief that the desensitizing treatment of hay-fever is followed in a certain percentage of cases by permanent cure, and such cases should be carefully analyzed with a view of making such successful results more common.

It is quite possible that patients are given the preventive treatment of hay-fever, who are already sufficiently desensitized. Patients should, therefore, be carefully tested before the opening of their hay-fever season, not only with a view to outlining the preseasonal treatment, if required, but also, in the case of a negative reaction, to avoid inflicting an unnecessary treatment on the patient.

Tincture of Iodine in Routine Pediatric Practice.

Writing in the *Medical Journal and Record* of December 16, 1925, SHEFFIELD recalls that the value of iodine in nose or throat affections has long been recognized by the profession at large. With the exploitation of the numerous newer silver preparations, however, its use has recently become somewhat restricted; yet it still has many adherents. A one-per-cent solution of tincture of iodine, in glycerin, preferably combined with one-quarter of one per cent of carbolic acid, often acts very efficiently in chronic rhinitis and rhinopharyngitis, and in suppurating adenoids. As in these cases the submaxillary glands are generally implicated as well, it is of advantage to apply also a five-per-cent solution of tincture of iodine in liquid vaselin to the swollen glands. Tincture of iodine he asserts acts almost as a specific in cases of postoperative infections after adenotonsillectomy, manifesting itself by persistent hyperpyrexia, undue sloughing of the tissues, and symptoms of general sepsis. Often after one swabbing of the throat all the symptoms disappear as if by magic. The application may be repeated once or twice a day for several days if necessary. He also mentions that the spasmodic coughing and extreme difficulty in swallowing, which occasionally result from injury or infection of the uvula during the tonsillectomy, are also quickly remedied by a few applications of tincture of iodine. In tonsillitis and cognate affections he prefers the following mixture:

> Tinct. iodini,
> Tinct. myrrhæ, āā f℥j.
>
> Sig.: Ten drops in a wineglassful of water to be used either as a spray or gargle every hour or two.

The same formula acts very beneficially also in stomatitis, pyorrhea, and gingivitis, while in alveolar abscess the undiluted tincture of iodine applied *pro re nata* is to be preferred.

Three Movements of the Bowels a Day.

In an editorial on this subject the *Medical Journal and Record* of December 16, 1925, states that three bowel movements a day are advocated by Fisk of the Life Extension Institute, and presumably he believes that this unusual liveliness of the gut will add to our span of existence. At a meeting of the trustees of that organization, ex-President Taft poked considerable fun at its director, saying, in effect, that he was well satisfied with the programme of the institute, but wished to be excused from complicity in such activity of the bowels.

Lane has recently championed this frequency of evacuation and recommends of course that constricting and obstructing bands be removed by the surgeon in order that such activity will be unrestricted.

Verily the colon, which formerly had a rather peaceful day of it after not more than one evacuation, has been much set upon since the days of Metschnikoff, and, with all the theories which have been

advanced against its sluggishness, or which threaten its very existence, we know of no actual figures to show that it is so at fault. On the contrary, there are statements that in cases where it does not empty itself for days the person may be in good health.

Perhaps its degree of activity needs to depend on what it contains. It is unfortunate that we have statements based on so little real knowledge but resting wholly on opinion or on a limited experience. If we would all be better off by defecating three times a day we certainly ought to be doing so.

In no field of physiology (normal and pathological) are we more lacking in knowledge that in that of what actually takes place in the course of the passage of food through the alimentary tract, and yet no ailments are nearly so common as those which have to do, directly or indirectly, with dyspepsia. It was not until recently that we had much knowledge of the time which it takes food in general to pass through various sections of the digestive tract, and, in fact, we know nearly nothing yet as to the time of passage, or what really occurs in the handling, of individual foods. It has long been known that there is a selection of foods in the stomach—that certain things are held for an hour or two longer than others, but we do not know about selection which may occur farther on. We cannot tell a patient whether it is the handling of the food of his supper, dinner, or breakfast which has gone wrong, or even if it was the meal of the day before which has been making trouble for him.

It is to be hoped that more thorough investigations will be made along these lines, for there is promise of blessing to a host of mortals through such studies, and it is not impossible that the origin of many diseases which seem unrelated to these daily disturbances that make life miserable, though they do not kill, will be cleared up.

In the meanwhile most of us will hardly find time for those three movements of an organ which was developed for the purpose of serving as a receptacle which might be emptied at convenience and on natural inclination.

Some Therapeutic Uses of Parathyroid Gland.

In the *Medical Journal and Record* of December 16, 1925, BERKELEY states that idiopathic tetany is a disease about which much has been written and little is actually known. Many experienced practitioners in American cities have never seen an adult case, though it is more common at all ages on the continent of Europe. In making the diagnosis the "obstetric hand" (Trousseau's sign) is mainly relied on both in adults and children; but this sign often appears temporarily in a miscellaneous multitude of evidently unrelated diseases, and is a poor dependence. He once saw it as a persistent hysterical symptom in a young woman otherwise in superb health.

Many writers try to differentiate infantile tetany and "spasmophilia" (whatever that may be) from the ordinary idiopathic tetany of adults. The blood in many of the infantile cases has been found deficient in calcium, and on the continent the profession generally consider symptomatic tetany at any age as a hypoparathyroidism. The suggestion originated with Jeandelise, so far as he knows, and dates from early in this century. One may accept it as a working hypothesis of the causation of a certain proportion of the cases.

Treatment theoretically consists in giving calcium and parathyroid, and in the relief or removal of complications. Complications in babies are diarrhea, rickets, and malnutrition; and in adults, pregnancy, dilatation of the stomach, and industrial poisonings of various kinds. Each of these conditions is to be cared for in the proper way, if the tetany is to be permanently abolished.

The possible connection of this disease, or of some forms of it, with chronic deficiency of the parathyroid glands was suggested by Lundborg, of Stockholm, in 1904, and by the writer independently in 1905. As long ago as 1886 Victor Horsley hinted at it after observing the tremors in some of his thyroidectomized animals; but he knew nothing of the parathyroids, and supposed the thyroids to be at fault.

In a previous communication Berkeley enumerated at length the considerations that lend some probability to the connection between the parathyroids and Parkinson's disease. The symptoms are strikingly similar; the disease has been sometimes associated with Graves's disease, and with myxedema, where one might not unreasonably surmise that the circulation of the parathyroids has been damaged by the adjacent thyroid trouble; and finally, in hundreds of cases of Parkinson's disease in the care of physicians all over the world, a majority of the patients have been benefited by parathyroid medication, when real parathyroid gland was given.

Many of the patients have been remarkably relieved. There is hope of some benefit in all patients except those afflicted with the agitans syndrome following severe cases of influenza (epidemic encephalitis?). Here, unfortunately, even the largest and most carefully administered doses are entirely without effect.

Surgical and Genito-Urinary Therapeutics

Calcareous Deposits of So-called Calcifying Subacromial Bursitis.

CARNETT *(Surgery, Gynecology and Obstetrics,* October, 1925) reports having seen more than twenty-five non-operated shoulders in which calcareous deposits were demonstrated with the *x*-ray. He records 19 cases subjected to surgical procedure. After reviewing the symptoms of an acute bursitis, which so often precedes the chronic form accompanied by calcareous deposits, Carnett notes that nearly all of the 19 operative cases were either of the acute type or were in an acute exacerbation stage of the chronic type at the time they first came under observation, and almost all of them were operated upon within the first twenty-four hours thereafter.

The deposit was removed in every instance, and all but one untraced patient are known to have been cured.

These deposits varied greatly in consistency. One was not unlike staphylococcic pus; usually the deposit closely resembled in appearance and consistency the contents of a sebaceous cyst; in two the deposit was rather dry and chalk-like, but not gritty; and in two it was granular and gritty.

The major portion of the deposit was lifted out with a blunt curette. Quite commonly the irregular walls of the cavity were smeared or infiltrated with the deposit and had to be trimmed away with knife or scissors. Multiple deposits in some cases called for incisions into the tendon.

The postoperative position of wide abduction, so commonly recommended to prevent adhesions, was found so uncomfortable that it was early abandoned. Practically all these patients had only a bandage sling to the wrist and held the arm in a position of moderate abduction, on a fat, long pillow which rested partly on the mattress and partly across the lower chest and abdomen. They were not restricted to this position, but from the first day were encouraged, but not obliged, to remove the hand from the sling at intervals and extend the elbow; to shift the position of the arm on the pillow; to move the shoulder in any direction they could; and even to sit up in bed or in a chair. At the end of the second or third day they were obliged to begin passive motion in the direction of abduction by interlocking the fingers of the two hands and using the well arm to elevate the bad arm. On the third or fourth day they were required to stand in a doorway or at some offset in the room and gradually "inch" their finger-tips up the wall. This exercise was repeated four or five times daily until they could reach the maximum height level established by the finger-tips of the sound

side. During the early days of this exercise the upward climb of fingers was assisted by using the sound hand to grasp and elevate the affected forearm or elbow and by having the patient step closer to the wall as the fingers ascended.

Beginning on the third day or soon thereafter the patient, while sitting, rested the arm on a table or on gradually increasing higher piles of books or pillows laid on the table; and from time to time depressed the body to increase the range of abduction. Occasionally within one week, and frequently within ten or twelve days, after operation, the full range of shoulder abduction was demonstrated by Codman's maneuver of having the patient stand with knees extended and touch the floor with his fingertips. About the fifth or sixth day efforts were begun to restore internal rotation by having the patient pass his sound hand across his back and grasp and make traction on the thumb or wrist of the affected side.

It should be noted that although these exercises were carried out by the patient himself, they are largely of a passive character and do not call for much muscular effort on the part of the affected shoulder. Active exercises are encouraged from the first and insisted upon after the first few days. The exercises were started early to prevent adhesions and were preferably and usually carried out by the patients themselves. Because they could exercise their arms dozens of times daily and could keep their shoulder motions within the range of pain tolerance they made more rapid and more comfortable progress than if they had had to depend upon a nurse or a physiotherapist. For the acute cases in which limitation of motion was due mainly to muscle spasm the preceding exercises were adequate to restore full but somewhat labored motion within ten days' time.

In all the acute cases relief from the pain immediately followed the operation. Frequently the patients upon recovery from nitrous-oxide-oxygen anesthesia reported within one or two hours that the old pain was gone and they were usually more comfortable the first night after operation than they had been the few nights preceding it. The patients usually were able to leave the hospital within a week or ten days. Several patients left the hospital on the first, second, and third day after operation.

Cases of chronic type, with but two exceptions, were all operated upon during an acute exacerbation. Operation gave them relief from pain only to the extent to which the pain had been increased during the acute exacerbation. The chronic pain they had before the acute exacerbation persisted after the operation and disappeared only after from a few days to several weeks.

At the time of operation on the chronic cases, in which limitation of motion was at least in part due to contracted muscles, only moderate force was used in making shoulder manipulations to restore motion. Moderate force was frequently adequate to restore full motion, but sometimes only an incomplete range of motion was obtained. In the chronic cases the patients were instructed to carry out the same postoperative exercises as in the acute cases. In these cases, however, much less rapid progress was made because of the persistence of the original subacute pain. Their own efforts at exercise very commonly had to be supplemented by surgeon, nurse, and physiotherapist both in the hospital, wherein their average stay was longer, and after going home. Baking, massage and vigorous passive motions had to be employed in many of these cases. A good device for the patient to use in his home for restoring motion in this and other types of shoulder fixed in adduction consisted of a clothes-line rope and an overhead pulley, each of which may be purchased at a ten-cent store. At the high points to which the patient can readily reach with his sound hand and the low point of the hand of the affected side loops are tied in the rope to serve as grips. A downward pull on the rope by the upward extended sound hand elevated the affected hand and arm. By seesaw movements of the rope the angle of abduction is gradually increased.

Restriction of outward rotation disappeared spontaneously after operation in the acute cases, but required corrective measures in a few chronic cases. The pain which persisted after operation in the chronic cases cleared up less rapidly under prolonged rest than under forced exercises, provided the latter were not carried to the point of aggravating the pain.

In several chronic and in a few acute cases, massage and special exercises such as swinging Indian clubs and swimming had to be employed to overcome atrophy of the shoulder muscles even after full motion was secured.

Symptomless bilateral deposits in the shoulders have been found accidentally in stereoscopic films of pulmonary cancer; a deposit had been present as long as three years without causing any symptoms; a deposit has been present but quiescent for four months and then caused symptoms; deposits have disappeared spontaneously; and a large dense deposit has been present and has not been demonstrable in an *x*-ray picture of the shoulder taken from only one angle.

According to the commonly accepted theory a partial rupture of the supraspinatus tendon is the injury which is usually responsible for the deposition of the lime salts.

Moschcowitz has made a careful pathological study of the tissues from Brickner's operative cases and has found that the lesion is one of "tendonitis," necrosis, and calcification.

In a fairly high percentage of cases the deposition of the lime salts occurs quietly, as the result of mild repeated traumata, and precedes, by days, weeks, or months, the onset of the clinical symptoms. After the deposit has formed, a very mild trauma may then incite an acute inflammation with a rapid development of the classical clinical symptoms. It also seems probable that some of the supposed partial tendon ruptures found at operation or autopsy may in reality have been tendon defects (cavities) caused by a deposit which may have been absorbed Or a tendon weakened by a deposit may rupture from slight violence, in which event the partial rupture is the result and not the cause of the deposit.

Some factor other than trauma, probably a disturbed metabolism, plays a part in these cases. Brickner points out that "the deposit occurs only in adults; it occasionally is encountered first in one shoulder, then in the other; in some persons the deposit undergoes absorption, in others it persists; although a common affection, many persons using their arms in the same way and subjected to the same influences never develop it; it occurs among the muscular and athletic as well as the sedentary and asthenic; in females as well as in males.

The bursal lesion forms the minor feature in these cases. Injury to the supraspinatus or much more rarely the infraspinatus tendon constitutes the dominant lesion.

In nearly all carefully observed cases the calcareous deposit has been found beneath the bursa, often embedded within the tendon where it is not in direct contact with the bursa at any point.

The treatment of cases of calcareous deposit will depend upon the stage at which patients apply for treatment. Accidentally discovered, quiescent deposits do not require operation. If a deposit is causing acute agonizing pain its removal affords the most prompt and most certain method of relief and cure. The more prolonged or more severe the pain, or the more serious the shoulder crippling, the greater is the need for operation.

The use of excessive force in manipulations of the shoulder or of any other joint is not justifiable. Moderate force by the Sir Robert Jones method of manipulation is frequently sufficient to restore complete range of shoulder motion, but if not the surgeon should be satisfied with partial restoration of motion at the time of operation and later secure full range by having the patient use the overhead pulley and rope. Rarely the patient's efforts will not

suffice, in which event it is better to resort to a second and third manipulation under gas anesthesia with moderate force rather than to use excessive force at the original operation.

The distress in acute cases and the acute exacerbation of symptoms in chronic cases are due to an acute inflammation superadded to the chronic inflammation which originally caused the deposit. This acute inflammation with its increased blood supply may result in absorption of the deposit irrespective of treatment or lack of treatment.

In those patients in whom occupational traumata are due to holding the arms in the abducted position (as in typewriters, piano-players, and machine-operators) it will frequently be found that the abduction traumata can be overcome by lowering the level of the machine or by raising the seat; or, if the patient stands at work, by raising him on a small platform. This absolute or relative lowering of the machine level automatically brings the elbows closer to the sides of the chest and thereby removes the abduction element as a cause of the trauma.

Active abduction by increasing the strain on the inflamed supraspinatus tendon increases pain. Passive abduction relieves the pain. A 40 to 60 degree angle of abduction can be obtained at night by resting the arm and forearm on a pillow which is placed with one end on the mattress and the other end over the patient's chest and abdomen. The same position is obtained by day, while sitting, by resting the arm on a pillow which is placed on the arm of a chair and across the lap or on top of a table. Sedatives may be required to procure sleep at night. If pain is so great as to require morphine, operation should be urged instead.

The tendency toward the formation of adhesions and the contracture of muscles must be overcome by early and daily resort to full abduction of the shoulder. This can be accomplished painlessly by having the patient touch the floor with his finger-tips while standing with knees straight.

A Manometric Study of the Cerebrospinal Fluid in Suspected Spinal Cord Tumors.

STOOKEY, MERWARTH and FRANTZ *(Surgery, Gynecology and Obstetrics,* October, 1925) note that spinal cord neoplasms, whether intramedullary, intradural or extradural, sooner or later obstruct the free subarachnoid space and interfere with the circulation of the cerebrospinal fluid. Hence a study of the circulation of this fluid should give data of value in determining the presence or absence of spinal cord neoplasms, by far the commonest form of subarachnoid block.

It has long been known that compression of the veins of the neck, by interference with the venous intracranial outflow, causes a rise of intracranial pressure, and, secondarily, cerebrospinal fluid pressure. Also, straining, blowing the nose, coughing or deep breathing, etc., increase the cerebrospinal fluid pressure.

When a manometer is attached to a needle in the lumbar sac and the veins of the neck are compressed an instantaneous rise of the fluid in the manometer takes place. Queckenstedt called attention to the fact that when the subarachnoid space is obstructed, the normal rise which follows compression of the veins of the neck does not take place.

The authors have made manometric readings in more than fifty spinal cord tumors and in others in whom spinal cord tumors were not suspected. If a single lumbar puncture does not give sufficient data, combined cistern and lumbar puncture is suggested.

Compression of the veins of the neck causes an increase in the cerebrospinal fluid pressure, due to an increase in intracranial pressure primarily. If there be a block this increase will not be transmitted to a point below the block. It is to be noted that coughing, straining, or deep breathing will increase pressure below the block, since increased intra-abdominal and intrathoracic pressure interferes with spinal and vertebral circulation. The authors have employed

both firm pressure, sufficient to cause cyanosis of the face, and extremely light pressure, which they term touch compression, and which they find of even greater value than the heavier compression. Light pressure in the normal individual will cause an appreciable rise in the manometer of from 10 to 30 millimeters, without evoking any straining reaction.

The technique adopted is as follows:

The patient is placed on his side in a horizontal position and made as comfortable as possible. After lumbar puncture, a period of three to five minutes is waited to permit the patient to overcome any pain or fear which may have a tendency to prevent the establishment of the normal level. As soon as complete relaxation is obtained the pressure reading of the cerebrospinal fluid is made. Normal pulse and respiratory oscillations of 1 to 3 millimeters are usually noted.

Touch compression is then exerted over the jugulars. This type of pressure consists of little more than placing the fingers gently over the jugular veins and exerting a moment's pressure. When the fingers are placed over the jugular veins an immediate and instantaneous rise of 10 to 30 millimeters is seen in the manometer. The presence of such an immediate and instantaneous wave generally foretells negative manometric readings in the remaining phases of the manometric tests.

The next step is to have the patient strain as if he were at stool, straining for ten seconds. This causes a marked, continuous and steady rise of 200 to 500 millimeters.

The next step is to apply firm pressure over the veins of the neck. As a technical procedure it is best to pass the hands around the side of the neck from behind, holding the palms and fingers flat and avoiding the trachea, so as to interfere as little as possible with breathing. With a little practice, pressure can be exerted without causing the patient to strain or cough. By elimination of straining and coughing, a more nearly pure compression of the veins of the neck is effected, thus avoiding factors introduced when intrathoracic or intra-abdominal pressure is invoked, which, as has been said, may complicate the picture. Pressure is exerted for ten seconds. The rise of the fluid in the manometer should be instantaneous and continuous approximately to 500 millimeters or more, and recession likewise immediate and uninterrupted, when the pressure over the veins is removed.

No extradural or extramedullary intradural tumor was found in any patient in whom a manometric test, negative in all phases, was recorded. To this rule there was no exception. Intramedullary tumors which give rise to symmetrical enlargement of the cord may, in their early stages, present completely negative manometric readings.

In all of the patients in whom manometric findings indicated complete block, definite obstruction of the subarachnoid space was found in those operated upon. The diagnosis could have been made from the neurologic examination alone by any one with experience in the clinical course of spinal cord neoplasms, irrespective of the manometric findings. The manometric findings merely offered confirmatory evidence in support of the diagnosis. When positive manometric findings are obtained through lumbar puncture, no further information of additional value can be gained from combined cistern and lumbar puncture.

Glycosuria in a Surgical Patient.

MENNINGER *(Surgery, Gynecology and Obstetrics,* October, 1925) presents his experience in the care of surgical patients with glycosuria, not only diabetic but non-diabetic in nature. The basic principles of conservation are to provide a maintenance diet and to control the diabetes with insulin as early as possible, maintaining the blood sugar at about the renal threshold; controlling the dosage by frequent urinalysis and, where necessary, blood sugar tests.

Insulin administration follows the urinalysis. The aim has been to reduce the glycosuria as soon as possible. This is checked by urinalysis every three hours, with immediate insulin administration based on the findings at each examination. This

three-hour repetition is continued until the glycosuria is reduced to a trace. As long as the patient has an acute surgical condition, it is the lesser of two evils to reduce the glycosuria to a trace, maintaining it about the renal threshold, and so prevent a hypoglycemia.

The quantity of insulin to be given in each dose must be determined by the urine findings (or blood findings), and is largely a matter of experience. When the Benedict's solution is turned a golden yellow-red, 20 to 25 units are given. The amount is lessened as the solution becomes green. The amount which may be given in any definite length of time certainly has a limit, but as long as glycosuria is present there is no danger from hypoglycemia. In one case, 140 units were given in fourteen hours, and in a second 125 units in twenty-four hours, with satisfactory results.

In cases in which acidosis is present, without glycosuria or where the glycosuria has cleared, it is necessary to administer glucose with the insulin. At least 50 to 100 grammes of carbohydrate should be given a day until the acidosis has cleared. Orange juice by mouth is sufficient, or if the patient cannot take fluid by mouth, 5-per-cent glucose is given by rectum. If this cannot be retained, 10-per-cent or even 20-per-cent glucose solution can be given intravenously. In such cases it has been found advantageous to disregard any glycosuria that may appear until the acidosis is cleared.

The insulin tolerance in cases of infection is much reduced as the infection subsides. Not infrequently its administration may eventually be entirely unnecessary. Hence while the initial 24-hour quantity, and often that for the second and third day, may be large, it must gradually be reduced. When the glycosuria has cleared and insulin is necessary to maintain the patient's *status pro tempore*, it is given three times a day.

Before operation the patient is given considerable water by mouth, and if necessary by rectum or subcutaneously. Following operation the patient receives at least 2000 cubic centimeters during the first twenty-four hours; by mouth if possible, or if not, four to six ounces of tap-water every six hours by rectum, and the rest by saline hypodermoclysis. A 3-per-cent glucose saline clysis has been used satisfactorily in indicated cases.

The particular type of diet makes little difference, so long as it is closely watched. The patient is started with a quart of whole milk per day. This places him immediately on a known food intake, which is continued until a special diet can be obtained.

For many years, alkali has been one of the important therapeutic agents used in diabetes. In the present series it was used in the earlier cases, but without observed beneficial effect. It has not been used in the more recent cases.

In a series of 47 cases treated before insulin, there were 20 deaths (42.5 per cent) and four additional cases which left the hospital in a critical condition refusing treatment. In a series of 22 cases treated with insulin, there was one death (4.5 per cent).

Treatment of Septicemias and Autointoxications in Infants and Children.

BROWN (*Illinois Medical Journal*, November, 1925) speaks of the empirical methods of treating blood infections by ablating foci and by elimination. He finds little to commend in various dyes and bactericidal solutions. Since the carriage of the toxic agency and its diffusion is by means of the blood he believes that the serviceable method of treatment lies in bleeding followed by transfusion, which he calls exsanguination-transfusion. If fresh blood be injected at the time the toxic blood is withdrawn a large amount of the latter may be taken from the system without causing symptoms of serious hemorrhage.

As to technique, he quotes from Robertson's description to the effect that as many donors must be on hand as are needful to supply more blood than that contained in the patient's body. Blood from the donors is withdrawn in 100-cc. glass syringes, each of which contains 10 cc. of freshly prepared 3.5-per-cent sodium citrate solution. As

each syringe is filled it is inverted several times to insure the proper mixing of the contents, and then emptied into a basin. A quantity equal, at least, to the total circulation is roughly 35 cc. per pound of body weight.

Into a suitable vein of the recipient, such as the internal saphenous at the ankle, or the median basilic at the elbow, a cannula is tied and 10-per-cent glucose is slowly introduced to prevent clotting. The exsanguination cannula is then inserted. In small infants the superior longitudinal sinus is made use of for the exsanguination, but in children in whom the anterior fontanel is closed the femoral vein provides a suitable substitute. The superficial veins are not satisfactory as they cannot be relied upon to yield a rapid and continuous flow of blood. When the femoral vein is used, a large cannula is introduced into it through the saphenous vein, which can readily be picked up just before it perforates the cribriform fascia. By introducing the cannula in this way, the continuity of the femoral vein is not disturbed, and the risk of injuring the circulation of the limb is avoided.

Blood is now withdrawn from the patient until signs of exsanguination begin. The amount of blood withdrawn at this stage varies greatly, and depends entirely on the effect on the patient.

The curative effect of this method of treatment in certain toxemias and septicemias in children has been amply demonstrated clinically and bacteriologically. This operation has been performed chiefly in the following conditions: (1) Acute intestinal intoxication; (2) erysipelas; (3) septicemia; (4) septic scarlet fever; (5) resorcin poisoning; (6) acidosis; (7) toxemia of severe burns.

As to the results of this treatment the authors claim a reduction of 55 per cent in the mortality of burn, a reduction of 45 per cent in erysipelas of the new-born, a reduction of 40 per cent in the mortality of acute intestinal intoxication, and a betterment which remains still to be proven in septicemia.

The Preformed Sac in Relation to Oblique Inguinal Hernia.

HUGHSON *(Surgery, Gynecology and Obstetrics,* November, 1925) notes that the preformed sacs of inguinal hernia are usually not demonstrable in the living subject. In a series of cases in which the inguinal canal was opened on account of a relaxed ring and in which no clinical evidence of hernia was seen, in every instance a small persistent sac has been found.

Analysis of a group of cases shows that 16 per cent of individuals presenting hernia on one side eventually develop hernia on the opposite side.

It is felt that correlation of these facts lends further strong support to the preformed sac theory in regard to the etiology of all inguinal herniæ.

A study of 100 consecutive cases of both single and double herniotomies has shown that the double operation increases the incidence of postoperative pulmonary infections, but it does not increase the incidence of wound infection.

If any operative measures are used to repair the relaxed ring, a complete herniotomy should be performed.

In this relation Russell *(Surgery, Gynecology and Obstetrics,* November, 1925) notes that all inguinal herniæ in childhood are funicular in origin and that the acquired form is non-existent. He observes that in at least 10 per cent of people at a moderate estimate one or both funicular processes are imperfectly obliterated, leaving conditions ready for the occurrence of hernia. Two per cent of children develop hernia.

Bearing on trusses for children he holds that the utmost that can be achieved by such laborious and uncertain treatment is to convert an actual hernia into a potential one—*i.e.,* to lessen the capacity of the open funicular process. He regards hernia in a child as a defect remediable by removal of the sac, and not properly speaking remediable in any other way, and every child without distinction of age that is brought with a hernia has the sac removed as a matter of course. There is nothing more striking than

the way in which an ill-nourished, constantly screaming infant subject to double inguinal hernia will be transformed into a comfortable, prosperous baby immediately after the double rupture has been operated on. There is no etiological difference between the hernia of children and the hernia of adults; oblique inguinal hernia in adults as in children is never anything except funicular in the male, and it is cured by removal of the sac, if it is efficiently done, just as surely in the adult as in the child.

Direct hernia (the ordinary form) is an affection of middle and later life mostly, and is of course not seen in childhood. In special cases of this kind the surgeon may think it wise to do a little suturing of the musculature; but he will find his inclination to do this decline with experience when once he has acquired the habit of a sound method of operating by removal of the sac alone. Unless surgeons make up their minds to alter their procedure, abandoning altogether all forms of suturing operations for oblique inguinal hernia, they will never distinguish between the saccular nature of oblique hernia and the non-saccular nature of direct hernia. And that distinction fully grasped is the basis of all real understanding of the problems presented by every form of hernia, wherever occurring.

Bearing on Russell's method of operation he thus outlines it: Seize the sac in a pressure forceps and pull it forcibly out; strip the structures of the cord completely away from the sac and abdominal peritoneum, and this involves working deeply in the abdomen; free the neck of the sac by sweeping the finger all around it.

Twist the sac tightly up until practically you can twist no more, pulling forcibly upon it all the time. This will insure that the entire sac will be torsioned up to the point where it comes off from the abdominal peritoneum, and it is at this point that the ligature must be applied.

Do not transfix with a needle; apply a "crusher" of some sort to the spot where the ligature is to go; below the crusher throw the ligature (catgut always, never silk), which will slip into the crush as the instrument is taken off.

Nothing more will remain to be done, except to repair the incision in the external oblique. Personally the author prefers to do this by merely including it in one or two of the stitches employed for closure of the outer wound.

Postoperative Parotitis.

NARAT *(Medical Journal and Record,* Nov. 18, 1925) notes that infection may be hematogenous, lymphogenous, or ascending, *i.e.,* by way of Stenson's duct. The primary focus of infection is usually localized either in the oral cavity, which harbors a multiplicity of germs, or in the abdominal cavity, where the bacteria may have been present before, or were inoculated during, the operation.

Contributory factors in the development of postoperative parotitis are as follows: the pressure on the parotid gland during manipulations on the jaw by the anesthetist; the lack of mastication resulting in stagnation of infectious material in the oral cavity; the dryness of the mouth following anesthesia, favored by the administration of purgatives and atropine before operation; and the limited intake of fluids after surgical intervention.

Pathologically the infected parotid gland may present a picture of a simple inflammation or the infectious process may progress to a diffuse or circumscribed suppuration; a real gangrene is sometimes observed.

Postoperative parotitis usually begins between the third and the seventh day after operation. The local symptoms consist in stiffness of one or both sides of the face and swelling and tenderness of one or both parotid glands. The general symptoms are malaise, elevation of the temperature and pulse rate, leucocytosis. The prognosis is serious: Wagner states that postoperative parotitis ends in death in thirty per cent of the cases.

In regard to therapy, nearly all the authors recommended an early institution of surgical treatment. Frank concludes from

his experience that when the swelling does not show any tendency to decrease in size in about four days, it is advisable not to wait for fluctuation, as the location of the pus is beneath the dense parotid fascia.

In regard to prophylaxis the necessity of oral hygiene should be emphasized. The condition of the teeth should receive the attention of the surgeon before the operation. After the surgical procedure efforts to maintain normal secretion of the saliva should be made. Lemon stick candy promotes salivation in a satisfactory way. If a postoperative parotitis develops, not only the local but also the general condition of the patient should be taken into consideration, when the question of surgical intervention is discussed. Daily leucocyte counts are advisable; a rising count indicates suppuration; because of a dense fascia fluctuation may not be present or appear very late. If there are no signs of developing septicemia and if the general condition of the patient is satisfactory, a conservative treatment may be instituted, consisting of antiseptic mouth-washes, promotion of salivation, compresses of hot boric acid and alcohol, supplemented by applications of therapeutic light. A watchful observation of the patient is essential; aggravation of the symptoms necessitates incision and drainage, but many disfiguring scars may be avoided if resolution can be accomplished without operating.

Faith in Ligatures.

Under this title BLAND-SUTTON *(British Medical Journal,* Nov. 7, 1925) publishes a contribution to surgery in his customary vivid style. He notes that the prime occupation of the surgeon is the treatment of wounds made by accident or by himself in the course of his occupation. The most obvious sign of the wound is bleeding, and surgeons are concerned with the arrest of bleeding, the closure of wounds, and sutures. The first aim in the treatment of the wound is to stop bleeding, then to free the wound from foreign bodies.

In the surgical treatment of incised wounds the methods and material used by surgeons are those of cobblers and tailors—sewing with thread and needle.

Plants, insects, and animals have been ransacked for suture material. The long tendons of the limbs and tails of mammals and legs of birds have been used from time immemorial for sewing pelts to be worn as clothes, and for stitching wounds.

In regions of the world as far apart as India, Brazil, and Asia Minor the mandibles of ants have been used from remote times as clips for securing the edges of wounds. Middleton describes the method of using them in Smyrna. The edges of the wound are pressed together and the ant applied by means of forceps. The ant separates its mandibles widely for defence, and as the insect is brought to the wound it seizes the edges and remains fixed. The body of the ant is divided with scissors, leaving the mandibles grasping the edges of the wound. In a week the wound is healed and the heads of the ants are removed. A wound rather more than an inch in length requires ten of these insects. The mandibles are antiseptic in virtue of formic acid normally present in ants.

For many years surgeons have been seeking a reliable material for stitching wounds. No material should be employed that cannot be sterilized by heat without destroying its efficiency.

Catgut prepared from the small intestine of sheep is, with many surgeons, a favorite material for ligatures and sutures. Its popularity is mainly due to the advocacy of Lord Lister. Catgut is a treacherous material, difficult to sterilize, and if thoroughly tanned to insure freedom from microörganisms it is as resistant as string. For closing the muscular and fascial layers of an abdominal incision it is especially dangerous. Many cases of wound-burst, postoperative peritonitis, tetanus, and gas gangrene have been reported from its use. The most reliable material for surgical use is silk. It can be obtained of any desirable fineness, even for sewing up wounds of blood-vessels. Above all things it can be sterilized by boiling without diminishing its strength.

Before the importance of strict cleanliness was appreciated by doctors and midwives, the simple and universal operation of applying a thread tightly round the navel-string was followed by an appalling mortality. This simple ligature is truly a thread of fate.

The wearing of sterilized rubber gloves when operating is the greatest improvement in surgery since Lister discovered the cause of sepsis. It is not only an insurance against infection, but promotes careful handling of living tissues, which are delicate and resentful, especially viscera. Gloves also protect the surgeon against infection from the patient. The human element predominates in surgery as in all affairs of life.

A simple method of tying the uterine arteries, instead of constricting the neck of the uterus with ligatures, was introduced by Baer of Philadelphia in 1892. This simple method transformed hysterectomy for fibroids from one of the most dangerous operations in surgery to one of the safest.

In surgery, clumsiness with aseptic precautions often ends in success, leaving dexterity associated with laxity in the application of Lister's principles grievously disappointed. Dexterity associated with asepsis invariably wins. The great advance in abdominal surgery is a consequence of the improvements in the preparation and choice of ligature and suture material. The method of tying divided blood-vessels was introduced by Paré in the sixteenth century, but the dangers of dirty ligatures were not realized until the middle of the nineteenth century. Knowledge of the fate of ligature was much advanced when Metchnikoff discovered the defensive mechanism of the cell elements of the blood. Surgeons still require a reliable ligature.

Manual dexterity in any trade can only be acquired by much practice. Skill is necessary even in the application of a ligature or a suture, but especially the ligature.

In surgery, as in all arts and crafts, the human element has to be taken into account. To watch a woman sewing neatly, quickly threading the needle, tying knots securely and surely, has a fascination all its own. The same is true of tailors, cobblers, and sailors—needles and awls suited to the job; the needles passed in and out at regular intervals, apparently without effort, makes sewing seem simple. A surgeon rarely sews with the same simplicity as a sewing-maid. He does not tie knots with the same certainty as sailors. Many surgeons fumble over knots; yet it is a matter of importance. A slipping ligature or a slack suture has on many occasions led to death. To insert sutures regularly and tie them sufficiently tight to prevent them slipping, and not so tight as to strangle the included tissue, requires much practice.

Digital clumsiness is as much a defect as color-blindness, but more obvious. The evil consequences of loose knots are outdone by the malicious influence of dirty ligatures and sutures.

The last appanage of an operation which surgeons will discard is dressings. It is a curious tradition that wounds require dressings and bandages. In civilized life it has become a cult to supply, roll, and apply bandages to wounded friends or foes.

Where drainage is unnecessary, dressings are unnecessary. Once daily the line of incision and the sutures are smeared lightly with tincture of iodine, or a similar antiseptic, and left exposed to air, or merely in contact with clean underclothes. The results are excellent—the wound heals rapidly, safely, and soundly with minimum discomfort and minimum expense.

It is important to keep bacteria out of a wound. Surgeons know that the methods employed in bacteriological rooms for sterilizing apparatus are ideal for the operating room—the application of heat by boiling or baking; all instruments, dabs, sutures, and ligatures are sterilized by heat. The hardest lesson came last. The most dangerous agents in the performance of an operation were the unclean hands of the surgeon and his assistants.

An uncontrollable factor in an operation is the preëxisting sepsis in the patient. Pasteur's influence is not limited by the

recognition of the microscopic agents of disease. His laboratory methods revolutionized surgical technique as well as those of the wine-press, distillery, dairy, and sewage farm. In spite of all advances operative surgery remains a simple craft. It is impossible to estimate how much greater would have been the sum of human happiness if surgeons had earlier appreciated the value of simple cleanliness in their operative work and in the simple matter of keeping clean their hands.

Indications for Tonsillectomy.

GITTINGS (*Atlantic Medical Journal*, vol. xxvii, No. 12) bases his paper upon the examinations and histories of some 677 cases. The follicles are composed of large mononuclear cells, which, by mitosis, produce small lymphoid cells. This is the only function of the tonsil about which there is practically unanimous agreement. The crypts are formed by invagination of the surface epithelium, but as it dips into the crypts the subepithelial tissue is lost and in many places even the basement membrane disappears. Since the crypts penetrate deeply into the structure of the tonsils these blind pockets, lined for the most part with only a thin layer of epithelium, offer an ideal structure for absorption.

The lymphatic drainage of the tonsils is from the crypts and follicles through the lymphatic radicles in the trabeculæ to the main efferent lymph vessels which lead to the cervical nodes. The tonsil possesses both efferent and afferent blood-vessels, but afferent lymphatics have not been indisputably demonstrated.

In view of the fact that faucial tonsils are the largest lymphatic structures in the mouth, and since all the mouth currents tend to pass over the tonsils in their general course toward the pharynx, the tonsil must bear the brunt of infection introduced into the mouth.

When the lympathic nodes of the neck also enlarge it means either that the infection has passed through the protecting structures of the tonsil and has invaded what Adami calls the second line of defense, or that the enlargement of both tonsils and nodes is a part of a general lymphatic involvement such as occurs in several conditions, notably so-called lymphatic fever, Hodgkin's disease, and leukemia.

Of the cases operated on the tonsils were found to be small and more or less buried in 13.1 per cent; moderately hypertrophied in 74.8 per cent, and greatly hypertrophied in 12.1 per cent. In nearly 93 per cent of the cases they were noticeably cryptic.

As to the operative indications, mouth breathing and snoring were present in 69 per cent of all the patients presented for operation. Sore throat was reported in only 58.6 of all the cases studied, and in only 22 per cent was it the chief indication for operation; 51 per cent of the cases gave a distinct history of cold in the head; 52.9 per cent were suffering from a recurrent and persistent cough. Only a little over 46 per cent presented enlarged cervical lymph nodes. Many cases suffered from malnutrition. In a total of 6304 patients, 21.6 per cent either suffered from ear disease or gave a history of it. In something over 3 per cent of the cases a history of arthritis was obtained.

Some authors advocate the removal of tonsils at the very beginning of an acute endocarditis, and it is becoming almost a routine procedure to perform tonsillectomy in chronic endocarditis, usually after compensation has become established.

In only one of 637 cases was nephritis present at the time of operation. In 41 per cent of the cases there were speech defects constituting the main indication for operation.

Simpson is quoted to the effect that of 571 cases in a boys' institution 8 per cent suffered from enuresis. There were three cases operated on because of night terrors. In 0.75 per cent tonsillectomy was performed chiefly on account of mental defects. The value of tonsillectomy in the eradication of diphtheria carriers has long been recognized.

Traumatic Fractures of the Vertebral Column.

MOORE *(Journal of the Missouri State Medical Association,* November, 1925) notes that imbalance of load in a single vertebra results in imbalance for the entire column. The comparable situation of flat feet and its remote static results in the lower extremities immediately comes to mind.

Incapacity for load bearing, or movement, of the spinal column may be of varying degrees. For instance, complete absence of motion, seen in the Marie-Strümpell type of spinal arthritis, or the total loss of weight-bearing capacity encountered in Charcot's spine, typify the extremes of dysfunction. Examples of milder affections are found in attacks of arthritis seen in focal infections and commonly spoken of as "lame back." Spinal incapacity may arise through congenital defects, intrinsic disease, or trauma of the spine. Probably far more frequently it is to be traced to that great group to which the term "arthritis" is applied, in the production of which age, occupation, social conditions, and infections, or toxic processes elsewhere in the body, play such a major part.

From whatever cause it may arise, spinal rigidity or weakness is a major disability of increasing importance as descent in the social scale takes place. A frequent cause of the state is fracture.

The frank vertebral fracture is usually easy of diagnosis and of no especial radiological interest. This is not at all true of those spinal injuries that lack cord symptoms and physical signs. Here is a group of difficult cases; one in which accurate *x*-ray diagnosis is essential and in which, if the correct treatment is applied, results will be as satisfactory as they are disastrous if it is omitted. Unfortunately, many of these cases, from one cause or another, are not even seen by a physician until long after the receipt of the injury, and the damage to the capacity and mobility of the spine is extensive and permanent. At such time the case is considered one of "back strain," "lumbago," or what not.

A possible explanation for the frequent lack of surgical attention in spinal fractures lies in the fact that such a large percentage are due to indirect violence and the fracture may exist at a distance from the point of application of violence, such as a compression of a dorsal vertebra resulting from a fall on the buttocks.

Loss of mobility and weakness are common to all affections of the spine. In addition there are manifestations that are referred elsewhere, and occasionally they are severe enough to suggest abdominal or thoracic disease requiring surgical measures. It seems to have been forgotten that spasm of the spinal muscles is frequently accompanied by spasm of other muscles of the trunk, the muscles of the abdominal wall and, of less importance, those of the thorax.

Any fracture of any portion of any vertebra may be so slight that it cannot be demonstrated by *x*-ray examination. With a history of trauma and symptoms of vertebral injury, a negative radiographic examination does not warrant the omission of treatment directed toward correction of fracture of the spinal column.

The author, in a study of clinical records, finds 53 fractures of the vertebral body in which 44 were of the compression type. The treatment indicated is prolonged support and fixation.

Speech After Laryngectomy.

Many surgeons have operated for cancer of the larynx, and when this neoplasm is intrinsically placed, with cures apparently radical; that is, these cases have survived and in health for many years. To one who has not seen the ultimate results it would not seem possible to provide these patients with any form of apparatus by which communication by any form of speech would be possible.

BURGER *(Proceedings of the Royal Society of Medicine,* November, 1925) reports on a patient first operated by laryngo-fissure for cancer of the vocal cord. There was a rapid recurrence. After a previous gastrostomy the larynx was removed. The wall of the pharynx having necrosed a plastic

operation was done, and a great skin-flap of the neck used for the formation of a new pharynx. Part of the external wound was covered by a flap taken from the thigh. Three years later his patient was well and had a new and a fair speech such as allowed him to perform all his business and to be a normal person in society. The mouth of the windpipe was situated in the neck with no communication whatever between the lungs and the pharynx or the mouth. The patient has a low voice, his speech is not monotonous, has modulation, and can be heard all over a large room. He telephones with Berlin and Munich and can sing with a pitch fairly well controlled. The range of voice is two octaves. He can whisper and whistle; he can smoke and blow out the smoke through the nose. He can blow out a candle a distance of twelve inches and can blow his nose. Eating and drinking cause no trouble.

About once a month a bundle of hairs, rooted deep down in his throat, grow into his mouth. These are cut off by his wife. The patient looks healthy and cheerful. An outsider may observe that his voice is somewhat harsh, his manner of speaking peculiar. Not more than three, five, or at most six syllables are pronounced consecutively. Then he closes his mouth, and after a deglutitive movement continues speaking directly. He can also speak without previous swallowing, but then for a shorter period.

The site of the pseudoglottis is at the mouth of the esophagus; in quiet respiration this mouth is always wide open. By day the patient wears his tube, as he speaks better with one than without, and also better when he wears collar and necktie.

In speaking a slight swelling arises in the neck above the fistula. In this patient's case this swelling is a disadvantage, for not until his abnormally wide hypopharynx is filled with air is it possible to utilize the other air for speech. This accounts for the fact that he can speak better with a collar and necktie on. When speaking without a collar he holds his head in a certain position, somewhat obliquely backward, to get out the sound in speaking. It is not only the esophagus which does duty for an air-chamber, but the stomach collaborates, as shown by *x*-rays; in order to force air through the new speaking apparatus the abdomen as well as the thorax is contracted to the utmost degree.

Colledge showed two cases illustrating the use of the McKenty-Western artificial larynx, as did Brown.

Tapia noted that patients could learn to speak, but advised against their making the effort since they would then refuse to use the artificial larynx devised by himself and which could be tuned by means of screws. Among his cases is a barrister who pleads cases before court and talks for hours with a remarkable absence of fatigue. One model of the speaking appliance is so devised that when the patient uses it he is supposed to be merely smoking a pipe.

Clinical and Radiological Diagnosis of Rickets.

COLE *(Minnesota Medicine,* November, 1925) writes on rickets and the means by which this affection may be distinguished from syphilis, oteogenesis imperfecta, and achondroplasia or chondrodystrophia fetalis.

Rickets is a constitutional disease which occurs in childhood and infancy, characterized by nutritional disturbances which result in a deficient deposit of lime salts in the bone. The most characteristic changes are in the epiphyseal cartilages, which become increased in thickness and much more vascular than normal. Irregularity, both microscopically and macroscopically, of the epiphyseal lines is also typical, and the shaft of the bone adjacent to the involved epiphyseal line becomes thicker, due to periosteal involvement. As a result of the interference with the lime salts in the bones, softening occurs and, secondary to this, deformities of many types, due probably mainly to mechanical causes. When the acute stage of the disease has subsided the lime salts are redeposited so rapidly in the bones that they frequently become much denser than normal, and ivory-like in hardness. The clinical

diagnosis of rickets can be made on many points, the most important of which are: enlargement of the epiphyses, especially at the wrist; the so-called rosary on the front of the chest; the large head; Harrison's groove across the thorax; and the deformities of the extremities, usually of the knock-knee or bowlegged type. Fractures may occur. The roentgenological picture is very typical, but varies somewhat according to the stage of the disease. In the acute stage the epiphyseal area is cloudy, and not sharply outlined, and the center of ossification in the epiphysis itself is mottled and uneven. The epiphyseal lines have a tendency to spread out, and the end of the metaphysis assumes a saucer-shaped appearance. This saucer-shaped appearance is more prominent in the lower end of the tibia and the lower end of the radius than in the other bones.

Syphilis of the bones and joints in children is always of a congenital type and gives a picture which is sometimes difficult of differentiation, but which is usually very typical. The disease manifests itself in many ways, the most common ones being an osteochondritis at the epiphyseal lines, a periostitis of a localized or diffuse type, and a formation of gummata. The condition is usually multiple. The osteochondritis, involving as it does the epiphyseal lines, simulates, to a certain extent, rickets and scurvy, but one always finds other signs of the syphilitic infection and the roentgenological examination is usually differential. Pain is always present with this type of lesion in the early stages, although later this disappears. Deformities of the affected bones sometimes develop due to irregular involvement of the epiphyseal lines.

The roentgenological picture varies with the stage of the disease. Usually there is a formation of new bone of the periosteal type and a marked disturbance of the epiphyseal line, the changes being on the diaphyseal side. There is never any saucer-like expansion, as seen in rickets, and the epiphysis itself is normal.

Osteogenesis imperfecta, a condition which is also described under various other names, such as fragilitas ossium, osteopsathyrosis, and osteomalacia, the latter being probably incorrectly used in this connection, is of unknown origin and is characterized by a marked fragility of the bones, leading to repeated fractures. The most typical clinical fact leading toward a diagnosis is the history of repeated fractures, the result of slight or almost negative injuries. The roentgenological picture is fairly typical and shows a marked atrophy of the bone, the shadows sometimes being so light that they approximate that of the soft parts. There are no joint or epiphyseal changes and the multiple fractures can be seen.

Achondroplasia is a congenital condition due to some unknown cause or causes, the most accepted theory being that the underlying factor is a tight amnion. The main diagnostic features are the short extremities and long trunk, enlarged and sometimes distorted joints, depression of the nasal bridge, and the so-called trident hand, due to divergence of the metacarpals.

The roentgenological picture shows what is probably a normal thickness of the bones of the extremities with a marked shortening, in the typical cases, and various distortions of the epiphyses themselves.

Acute Arteriomesenteric Ileus.

McLAUGHLIN *(Minnesota Medicine,* November, 1925) defines acute arteriomesenteric ileus when it occurs as a postoperative complication as characterized by symptoms of high obstruction, principally persistent vomiting. It occurs usually in individuals who have lost considerable weight, and have a ptosis of the abdominal viscera. This is one of the most important and constant etiological factors.

The condition is a true intestinal obstruction, and the obstruction occurs in the transverse portion of the duodenum at the point where it is crossed by the superior mesenteric artery.

In visceroptosis, the small intestines and cecum lie at a lower level than normal, much of them being in the pelvic cavity. In the dorsal position, the weight of the bowel causes a pull on the mesentery and the main

trunk of the superior mesenteric artery, the cecum pulling through the terminal ileum. This tension causes an obliteration of the angle which the artery makes with the vertebral column and aorta, thus compressing the transverse portion of the duodenum between the cord-like trunk of the artery and the aorta and thereby producing an obstruction. An acute dilatation of the stomach follows, which tends to aggravate the condition through pressure.

McKenty of Winnipeg has reported twenty-six cases in which he has found a chronic obstruction to the duodenum due to this cause. These patients presented various dyspeptic symptoms.

The symptoms are those of a high intestinal obstruction. There is persistent vomiting of dark bilious material which keeps on in spite of repeated stomach washing. There is no great amount of abdominal distention, and enemas are successful in that plenty of flatus is passed; but the vomiting continues. The patient becomes dehydrated, the respiration shallow, and the pulse rapid and weak.

The treatment is as simple as it is satisfactory. It consists in raising the foot of the bed and resting it on eighteen-inch blocks, and turning the patient into the right lateral prone position, thus allowing the cecum and intestines to gravitate upward, and release the tension on the mesentery.

The results of this simple maneuver are so startling as to border on the marvelous. Within a short space of time the picture changes, the vomiting stops, and the patient is in comparative comfort.

McLaughlin reports two cases, the first following an appendectomy; persistent vomiting called for systematic gastric lavage on the second day. This was continued as the vomiting continued. Dehydration was met by intravenous saline. On the sixth day, there being no betterment in the patient's condition and a running pulse indicating a bad prognosis, the head of the bed was elevated on 12-inch blocks, and the patient was turned into the right lateral prone position. Three hours later the stomach tube was passed, drawing off some dark fluid, but not as much as before. The 12-inch blocks were replaced by 18-inch blocks. Three hours later the stomach was found empty. From that time improvement was rapid, the patient making an uninterrupted recovery.

The second case was characterized by persistent bilious vomiting for three days in spite of all treatment, including repeated gastric lavage. On elevating the foot of the bed as indicated above, vomiting promptly ceased.

A Study of the Intramural Portion of Normal and Diseased Tubes, with Special Reference to the Question of Sterility.

GEIST and GOLDBERGER *(Surgery, Gynecology and Obstetrics,* November, 1925) show that the intramural portion of the tube can be recognized by the typical well-developed musculature which stands out prominently. The outer circular muscularis is poorly developed. The mucosa shows typical high cuboidal, ciliated epithelium, with no distinct villi, but suggestions of folds. These folds occasionally become a little more prominent as the isthmus is approached.

The lumen is only 0.5 to 1 millimeter, and in its entire course is surrounded by a dense unyielding uterine musculature. In some instances, in non-inflammatory cases, they found a definite obstruction of neoplastic nature to the tube at its intramural portion. In some instances cornual polyps and in two cases small fibroid nodules one centimeter in diameter were so situated in the horn as to occlude completely the tubal lumen.

They conclude their article as follows: In view of the frequency of diseased conditions in the intramural portion of the tubes that may offer a decided bar to the ascent of the spermatozoa or the descent of the ovum, it is essential to determine the site of all obstructions in diseased tubes. The important thing is to determine if the obstruction is only at the fimbriated extremity, at the intramural portion, or at both places. Probing the tube (whose caliber is from 0.5 to 1 millimeter) is practically impossible.

Reviews

FACTS ON THE HEART. By Richard C. Cabot, M.D. Illustrated. W. B. Saunders Company, Philadelphia, 1926. Price $7.50.

Dr. Cabot is well known to the profession not only because of one of his earlier books upon Physical Diagnosis, but also by reason of the fact of his institution of Social Service and publications which have served to indicate his thoroughness as a clinical observer. In this volume, which contains approximately 800 pages, he has analyzed the ward records of nearly 2000 cases, which were subsequently decisively diagnosed by post-mortem examination, or, to express it differently, he has started from the post-mortem diagnosis and worked back into the clinical records. Some of the patients were under his own care during their lifetime and others under the care of colleagues, a very considerable number of whom have helped him materially in the preparation of the text both from the bedside standpoint and the autopsy table. So largely have these other workers in this field assisted him that Cabot modestly states that his task has been to put together and edit the material, thereby assigning to himself a time-consuming task.

As the author points out, the book differs from all those previously written on heart disease, in that it bases its conclusions wholly on the study of the cases which came to autopsy.

There is very little about treatment, as the author says "Most of the little that I know on that subject is to be found in the records of some of the illustrative cases."

He has divided his text into twelve chapters, with a final addendum in which he summarizes the facts presented in these chapters. The titles of some of the chapters are as follows: Rheumatic Heart Disease; Syphilitic Heart Disease; Hypertensive Heart Disease; Myocarditis; Angina Pectoris; Acute and Subacute Endocarditis; Chronic Non-deforming Valvular Sclerosis or Endocarditis; Acute and Chronic Pericarditis; and Thyrocardiac Disease. The twelfth chapter deals with congenital heart disease.

To those who are interested in studying the etiology and morbid anatomy of cardiac conditions, this text will prove very valuable. In many places it is made up in the form of questions and answers put by Dr. Cabot or his colleagues as if they were discussing a given patient in a medical society or in a clinic.

In the summary to which we have referred the author points out that each infection has a peculiar affinity for some part of the heart; thus rheumatism usually affects the mitral valves; syphilis falls upon the aortic arch or the aortic valves; the causes of hypertension, whatever they may be, result in enlargement of the heart, leaving the valves intact. An interesting point is also emphasized, that rheumatism and syphilis almost never affect the same heart and that hypertensive disease with either of these infections is rare. This we are bold enough to doubt.

The busy medical man in this summary can obtain many most excellent points of clinical importance, and when he wishes to learn more concerning a given dogmatic statement, can turn to the main body of the text and obtain the reasons for the author reaching his final opinion.

THE PRINCIPLES AND PRACTICE OF ENDOCRINE MEDICINE. By William N. Berkeley, Ph.D., M.D. Illustrated. Lea & Febiger, Philadelphia, 1926. Price $4.50.

Dr. Berkeley has during the last two decades been a most intent student of endocrinology. He tells us in his preface that the title of his volume is meant to be accurately instructive, because he believes that the practice of endocrine medicine is becoming daily a more important and fruitful field of medical labor; and, again, that his text is primarily meant for doctors in active practice, so that his wish has been to avoid theoretical conclusions and deductions. Because of his intention to make the book

practical, he has of necessity failed to discuss certain topics of exclusively scientific interest or only touched upon them lightly.

He divides his text into fifteen chapters; the first one dealing with glandular therapy in general; the second with the relationship between the autonomic nervous system and the glands of internal secretion; and the third with basal metabolism, in which chapter he deals with direct and indirect calorimetry, calculations, precautions, and clinical value. In the succeeding chapters he takes up, one by one, the thyroid, the parathyroid, the pituitary, suprarenals, pancreas, sex glands, the pineal body, the thymus, and even includes the intestinal mucosa, the mammary and salivary glands, spleen, uterus, prostate, carotid body, placenta, and kidneys. An interesting chapter is number thirteen, upon the relations of the glands of internal secretion to one another, a subject which is gaining greater and greater importance as we understand the physiological activity of these glands. Lastly he discusses gland grafting and endocrine influences on growth, in old age, and in obesity.

This book is interesting and contains much of great import.

MASSAGE AND THERAPEUTIC EXERCISE. By Mary MacMillan; second edition, reset. The W. B. Saunders Company, Philadelphia, 1925. Price $2.50.

The authoress was attached to Sir Robert Jones's clinic in the Southern Hospital, Liverpool, but more recently has been the Director of Physio-Therapy in the Harvard Medical School. In the space of less than 350 small pages she divides her text into 21 chapters, with an appendix, in which she deals with the various forms of massage and Swedish exercise, then with the pathological conditions to which these measures may be applied, such for example as Volkmann's contracture; stiff joints; synovitis and bursitis; nervous diseases, strains and sprains and dislocations. The second part of the book deals with therapeutic exercises for the purpose of overcoming spinal curvature, knock-knee, and other defects, with additional chapters upon respiratory exercises in convalescents from thoracic disease, exercises by which therapeutic results may be obtained in cardiovascular disturbances, and, last of all, exercises for ataxic conditions and spastic paralysis. Numerous illustrations are introduced to show how by means of apparatus good results can be obtained.

She well raises the point that these therapeautic measures are not resorted to with sufficient frequency, the great difficulty being that the average physician and surgeon has not the time to devote to the treatment of such conditions by such means. Nevertheless, an active physician can gain much valuable information from these pages, and by putting the book into the hands of a trained nurse he will be able to carry out most of the treatments recommended with fair success.

ABDOMINAL OPERATIONS. By Sir Berkeley Moynihan. Fourth edition, revised. Illustrated. In two volumes. W. B. Saunders Company, Philadelphia and London, 1926.

In his preface to this, the fourth, edition of Abdominal Operations Moynihan notes that it is twenty years since the first edition appeared, the third having been put forth before the war. The author practiced a drastic revision, having as one of his aims economy of space in the direction of compression and excision; which have not equaled, however, the volume of new matter found needful to add. He places special emphasis on his chapter on Surgical Technic, which he regards as the most important of all the essentials of good work. He observes that "Surgery to-day is being practiced by too many light-hearted and incompetent surgeons, who have neither sought, in due service, to acquire a mastery of their craft, nor have learned, from the experience gained by long association in hospital work, when an operation should be done, when left undone, how made safe, how made to fall lightly, upon a patient already afflicted, it may be, by mental no less than by physical distress."

In Section I of the first volume, the first chapter, a brief one, is devoted to Bac-

teriology of the Stomach and Intestines. Thereafter follows a chapter on what Moynihan terms "the ritual of an operation," which he holds commences before and sometimes long before the incision is made, and may continue for a long period after the wound is healed. This chapter is a literary masterpiece; with its teaching every practicing surgeon should be absolutely familiar. There could be no better text for the student of medicine.

The third chapter is devoted to Complications and Sequels of Abdominal Operation. In this chapter, indeed elsewhere, for purposes of the active surgeon there is more attention devoted to the discussion of various theories and methods than would seem profitable. The profession wants from Moynihan an expression of his own beliefs and practices. Among complications are mentioned parotitis, acute dilatation of the stomach, and acidosis. There is no mention of alkalosis, nor indeed is there a discussion as detailed from the standpoint of prevention and treatment as would suggest a wide familiarity with more recent studies.

There is an excellent chapter on Abdominal Incisions. Considerable space is devoted to surgical treatment of visceral prolapse and also to surgery for intestinal stasis.

The remainder of the first volume is devoted to operations upon the stomach and upon the intestines; adequately described and illustrated.

The second volume takes up operations upon the intestines, upon the liver, and upon the pancreas and spleen. It is noted that cancer of the large intestine is among the least virulent of malignant growths. Moynihan states that "if cancer is developed in the body, there are few places it could select with so happy a chance of ultimate and complete relief as the large intestine."

Bearing on intestinal obstruction Moynihan alludes to the facility incident to previous experience acquired by the surgeon in finding the site of obstruction. He holds that after a few cases have been explored it is easy to feel at home in the abdomen and recognize any obstruction without serious difficulty. He deprecates a search of more than three or four minutes. It is better to allow much of the intestine to escape from the abdomen than it is to prolong a blind exploration. Before this is done a mackintosh wrung out of hot sterile salt solution is placed on each side of the wound. After relieving the seat of obstruction he insists on the emptying of the distended coils of their contents, describing and illustrating the way this may be done.

There are admirable sections upon operations upon the liver, the pancreas and spleen; the latter contains an excellent historical review, and thereafter a discussion of the various diseases and their appropriate treatment.

As for this book as a whole it is put forth in Saunders's best style. It is written in the main in that lucid, vivid manner characteristic of Moynihan, giving his large experience, carrying his enthusiasm for the work, and insisting on that attention to detail which has contributed so largely to his success.

Those who delight in discussions and presentment of various theories will find in many parts of this work complete satisfaction. Those who would have Moynihan's practices will find them lucidly set forth. They will not always find after a somewhat elaborate presentment of various theories that clear-cut decision which he undoubtedly makes for himself. There is a suggestion through the work that the star of first magnitude has called in a scholarly associate and industrious assistant.